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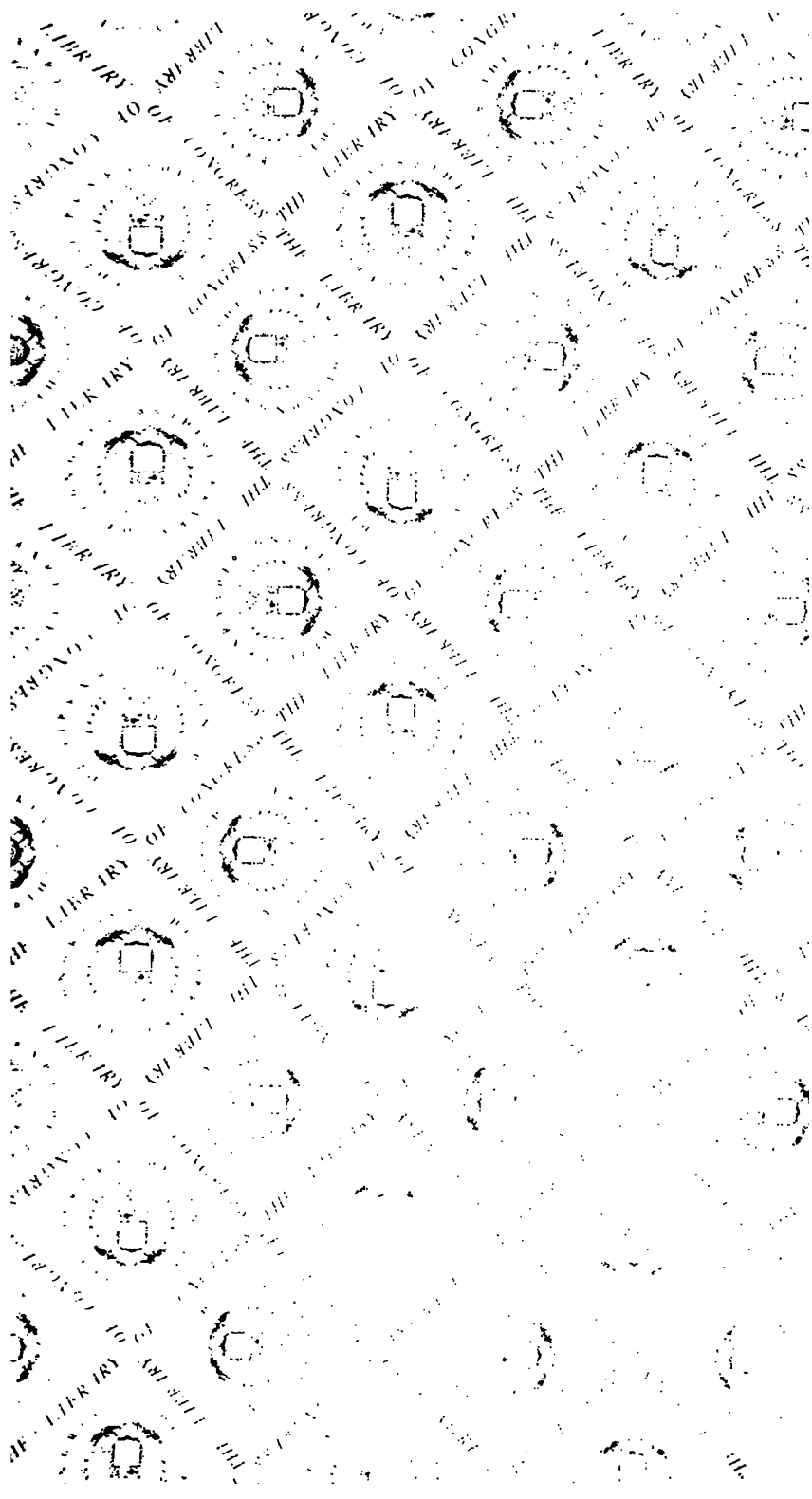
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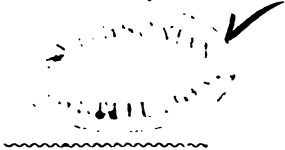
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JOURNAL
OF THE
EAST AND WEST OF ENGLAND SOCIETY
FOR THE ENCOURAGEMENT OF
AGRICULTURE,
ARTS, MANUFACTURES, AND COMMERCE.



WORK AND LEARN.

VOLUME VII.

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"He that goes about to forward agricultural improvement must begin by finding out the true reasons of what is called routine, or the 'custom of the country.' It sometimes happens that these reasons are only accidental, and then you may dismiss them fearlessly; but it often turns out that every-day practice rests on a solid foundation of facts; and then if you make an onslaught on local prejudices, they will be sure to beat you.

"The true course for the agricultural improver is, to take one step at a time, to gain a clear insight into facts by experience, not to try to go too fast, and to trust to the work of time.

"If practice which sets up to do without theory is contemptible, theory without practice is foolhardy and perfectly useless."—*From the Rural Economy of England, Scotland, and Ireland.* By LEONCE DE LAVERRONE.

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INTRODUCTION.

THE present volume marks an era in the history of our Society. As an American once remarked, "We are growing fast; let us hope we are not growing loose at the same time." The character of the past year has been extension in the area and in the objects of the Society; accompanied, to a certain but still insufficient extent, by an augmentation of its funds.

One strong proof of the continued attention of the Council to the interests of agriculture, and of the cordial harmony subsisting among its members, is to be found in the Report on Agricultural Customs and Covenants, presented by Mr. Gordon, and now first published. The Report was agreed to unanimously by a committee, including owners, occupiers, and managers of land, and lawyers, twenty-four in number, of whom twenty-two took an active part in the proceedings. The reception by the Council of this Report, so carefully considered, and the order for its publication, in connexion with the explanatory documents giving the reasons on which it was founded, is an event for which we believe there is no precedent in any other Agricultural Society. How it would have gladdened Philip Pusey, grappling as he did with the subject of tenant-right in Parliament, thwarted as he was in his endeavours, if he could have seen this result of English fairness and free discussion!

The Committee aims at no more than to aid in laying a just basis for the growth of that public opinion by which all progress in England is guided; and both the Committee and the Council carefully guard against the supposition that any interference with private arrangements is proposed or intended.

The extension of the Society's operations, by its acceptance of the invitation to visit Cardiff, has proved the advantage of intercommunication, which has already borne good fruit in improved steam communication and an increased demand for the best breeds of cattle and sheep. Nothing has occurred in any way to disturb the basis of the Society's constitution, but it has gained friends; while the hospitality, zeal, and ability displayed by our

Welsh neighbours, now made more near, will long be cherished by every member of the Council who was among the half hundred who stood up to acknowledge the courtesies of the Mayor, Charles Croft Williams, Esq., of Roath House. It will not be the fault of the Mayor and Local Committee of Barnstaple, if the year 1859 does not hold out sufficient attractions to induce a continuance of the intercourse so pleasantly inaugurated in 1858.

This year marks also a point of advance in the implement exhibition,—the point, namely, at which, by common consent of a large number of the exhibitors, purchasers, and officers of the Society who have so ably and zealously conducted the competitive trials, the prize system may safely be dispensed with. The transactions in the implement trade resolve themselves now into the ordinary relations of business, aided by the opportunity of an annual gathering for comparison, selection, and purchase.

The West of England has fully maintained its character in the local examinations both of Oxford and Cambridge, at Exeter, Bath, and Bristol. Some explanatory documents are inserted in the present volume. It is satisfactory to learn that in the birth-place of these examinations the entry of candidates for 1859 keeps up, notwithstanding the severity of the test applied by the University at the first examination, and the raising of the fees to be paid by the junior candidates for the present year. The entries of the senior candidates at Exeter are the same as last year, 29; the juniors 54, instead of 55. Only six of one class and seven of the other decline the religious examination.

The projected fulfilment of the original idea of the Society, by the establishment of the Arts and Manufactures Department, is explained in various papers in the present volume of the Journal, and has also been warmly and liberally advocated by some of the most influential conductors of the Local Press. To Dr. Scott the Society is indebted, not only for his paper in the Journal, but also for unremitting attention to the details of the arrangements. Indeed, the pledge given to the Council, that efficient voluntary assistance would not be wanting, has been fully redeemed by the gentlemen who have acted on the Arts and Manufactures Committee, both in the way of personal exertion, of liberal contributions, and of other facilities for the discharge of business. None of those gentlemen, however, will hesitate to confirm the statement that to the organisation of the whole scheme Mr. Gendall has brought to bear an amount of personal

influence, activity, and skill, which it would have been difficult to supply without him. Much credit also belongs to enterprising tradesmen in Exeter, Bristol, and elsewhere, whose appreciation of the practical tendency of the Exhibition has led to contributions of extraordinary value being sent by distant manufacturers. The thanks of the Committee are also in an especial manner due to Mr. Redgrave, Mr. Macleod, and Captain Fowke, officers of the South Kensington Museum, who, in the absence of the Secretary, Mr. Cole, on the Continent, rendered every assistance in their power to forward the objects of the proposed Exhibition.

Supported as the promoters have been, it only remains to express the hope that the exhibitors will, in their turn, receive the support of the public; in which case the success of the experiment may be considered as ensured.

Such are some of the actual and probable results more or less owing to the harmonious action of the Society up to the present time. That its work has received the notice of the Royal Consort of our Gracious Queen is an honour of which every member of the Society feels proud. The unsolicited permission to enrol the name of his Royal Highness as an annual Subscriber to the Society, and also as one of the exhibitors at the Barnstaple Meeting, adds to the value of the encouragement given to the extended plans of the Society. Such tokens of the interest awakened in high quarters by voluntary efforts for any worthy object, and the warmth of feeling which is kindled in return among large bodies of the Queen's subjects, are among the golden links which bind together all classes of a free and loyal people.

The Journal Committee has received the valuable additions of the names of Mr. Gabriel Poole and Mr. Robert Dymond: Mr. Josiah Goodwin has prepared the Note Book, and assisted throughout in the revision of the present volume. Feeling, as the Editor is obliged to feel, that he must ask to be relieved in future from much of his former responsibility, he is also convinced on other grounds that the time is come for making some more efficient arrangement for the conduct of the Journal. But he would be ungrateful indeed, if he was not sensible of the support and kind forbearance which he has uniformly received at the hands of those with whom it has been a pleasure and an honour to act.

Dismissing this last sheet, as the Editor is compelled to do in the midst of duties of a very different kind, he hopes he may be forgiven for closing this notice of the past, as in the sixth volume,

with a quotation. It is taken this time from a thoughtful divine on whose pages his eye has rested for a moment:—

“It is not in times of action and of effort only, that Christ’s miracles of nature speak with comfort to our hearts. There is scarcely one of us, I fancy, who has not at some time stood face to face with some of the grander spectacles of the outer world, with a mountain throned in calm cold majesty or with the starry sky, fearful in its impenetrable depth, till he has felt the cry of David rise to his lips as the utterance of hopeless despair; and then it is that the thought of Christ, the Sovereign and the Redeemer, converts the words of despondency into a hymn of triumph (Ps. viii. 4; Heb. ii. 5). We recal the events of our past life in silent review, and trace back our position . . . to some trivial cause; . . . and as we are tempted to ascribe all to blind fate, the old scenes by the Galilean Lake confirm by living proofs the great truth that ‘Chance also is the daughter of Forethought,’ so that the least details are ennobled by the thought which threatened to rob the whole of its dignity.”

Then, quoting a noble Greek fragment which adds that “Chance is also the sister of order and persuasion,” the author points out that the three-fold offspring of Forethought represents the working of Providence.

“It first appears as Chance in regard to its occurrence, it next works Persuasion as men bow to its decrees, and at last it issues in Order.”*

May we not—while thankfulness for the past blessings of this country is mingled with anxious forebodings for the future—gather heart to persevere in efforts for national improvement, from the thought that peace and order depend less on the chances of strife than on the gradual persuasions of rational beings, and on calm forethought for the claims and wants of all classes?

Sidmouth, May 25, 1859.

* Sermon ‘On Christ’s Miracles on Nature,’ by Rev. B. F. Westcott, one of the Masters of Harrow School, p. 34.

RESOLUTION OF THE COUNCIL APPOINTING
THE COMMITTEE.

COUNCIL MEETING, 28th November, 1857.

On the Motion of Mr. Gordon : Resolved,—

That a Committee be appointed to consider whether Society may with advantage prepare some suggestions arrangements between Landlord and Tenant for the Cultivat of Land, in the West of England, suitable to the advanced st of Agriculture, and to consider other subjects connected the with, which may tend to promote its further progress.

That the following Gentlemen be nominated a Committee the above purpose :—

LORD PORTMAN.
W. MILES, M.P.
C. A. MOODY, M.P.
T. D. ACLAND.
G. H. ANDREWS.
J. H. COTTERELL.
T. DANGER.
J. DAW.
ROBT. DYMOND.
M. FARRANT.
C. GORDON, JUN.
J. GOULD.
J. GRAY.

J. D. HANCOCK.
W. HOOPER.
THOS. HUSSEY.
J. E. KNOLLYS.
R. MAY.
T. NEWMAN.
G. S. POOLE.
W. PORTER.
J. SILLIFANT.
ROBT. SMITH.
J. WIDDICOMBE.
W. WIPPELL.

PROCEEDINGS OF THE COMMITTEE.

First Meeting of Committee, Taunton, 9th Jan., 1858.

Present.

C. GORDON, JUN., Chairman.	J. E. KNOLLYS.
T. D. ACLAND.	E. MAY.
G. H. ANDREWS.	W. PORTER.
J. H. COTTERELL.	J. SILLIFANT.
T. DANGER.	J. WIDDICOMBE.
J. D. HANCOCK.	W. WIPPELL.

Resolved,—

That this Committee consider that they may with advantage prepare some suggestions for arrangements between Landlord and Tenant.

Resolved,—

That, with a view to lay a foundation for any suggestions to be made by the Committee, it is expedient to collect information as to any of the most improved arrangements between Landlord and Tenant.

Resolved,—

That a Copy of the foregoing Resolution be forwarded to each member of this Committee, with a request that he will endeavour to bring, or transmit, to its next meeting, all the information he can obtain.

Second Meeting of Committee, Feb., 1858, Taunton.

Present.

C. GORDON, Chairman.	JOHN GOULD.
T. D. ACLAND.	THOS. HUSSEY.
J. H. COTTERELL.	R. MAY.
T. DANGER.	W. PORTER.
M. FARRANT.	W. WIPPELL.

The CHAIRMAN laid before the Committee the communications which had been placed in his hands by various members of the Committee.

The Committee agreed to consider the subject referred to them under the following heads:—

- A. Verbal and written agreements.
- B. Time of entry on farms.
- C. Cultivation clauses.
- D. Compensation to out-going tenants.
- E. The question of pre-entry for cultivation before occupation and of consuming produce after the expiration of term.

Resolved,—

- A. That it is desirable that all agreements between landlord and tenant be reduced to writing.

Resolved,—

- B. That it is inexpedient for this Committee to recommend any particular period for entry on farms generally.

Resolved,—

- C. That it is desirable that as a general rule more discretion as to the mode of cropping arable land should be given to the occupier than appears to be usual in existing agreements and leases.

Resolved unanimously,—

- D. *a* That the ordinary obligations of a tenant include the following points:—

1. That whenever he quits his farm he shall leave it free from weeds.
2. That he shall also leave the land in such a state as to tillage as not to cause loss in cultivation for the next crop.
3. These two obligations ought to be indispensable in all cases, and without reference to the state of the farm at the commencement of the tenancy.

- b* That there are corresponding obligations equitably incumbent on a landlord towards an outgoing tenant, *viz.*, to reimburse the tenant—

1. For crops in the land.
2. For preparation for ensuing crops, but only for *such as should be performed in the usual course of good husbandry.*
3. For purchased manure in the ground (a certain proportion of the cost).
4. For purchased food consumed on the premises by cattle, sheep, and pigs within a limited period before the expiration of the tenancy (a certain proportion of the cost).
5. For corn raised on the farm which might have been

carried to market, but was consumed in like manner and within the like period (a certain proportion of the cost).

N.B. It is advisable that these items 3, 4, 5 should be matter of special agreement between landlord and tenant.

Mr. Acland was requested to prepare a Draft Report to be submitted to the Committee.

Third Meeting of Committee, Taunton, 27th March, 1858.

Present.

C. GORDON, Chairman.	J. E. KNOLLYS.
T. D. ACLAND.	R. MAY.
J. H. COTTERELL.	G. S. POOLE.
T. DANGER.	W. PORTER.
M. FARRANT.	R. SMITH.
J. HANCOCK.	W. WIPPELL.

The Minutes of the last Meeting were read and confirmed, with some verbal amendments, and signed by the Chairman.

Mr. ACLAND presented a Draft Report (see p. xix) which he had prepared in compliance with the instructions of the Committee at its last Meeting, a copy of which Draft had been forwarded to every Member of the Committee.

On the proposal that the Resolutions containing a summary of the Draft Report be taken into consideration *seriatim*, it was resolved that the Resolutions of the last Meeting be first reconsidered. After a long discussion the following amendments were made :—

Resolution A, after the words “*reduced to writing*,” the following words were added, “*and signed before the tenant enters on the land*.”

Resolution D. a 1, for the words “*free from weeds*,” were substituted the words “*clean in an agricultural sense*.”

In Resolution D. b, the word “*equitably*” was omitted.

Clause D. b. 5, “*For corn raised*,” &c., down to the word “*cost*,” omitted, and consequently the figure 5 (in the first line of the following note) omitted.

It was then moved—That the Committee do now report progress, and that this be the Report of the Committee.

“That the Committee had met on the 9th of January and at following periods, and had resolved as follows :—

“That the Committee consider that they may with advantage

prepare some suggestions for arrangements between landlords and tenants.

“ That it is desirable that all agreements between landlord and tenant be reduced to writing and signed before the entry of the tenant on the farm.

“ That it is desirable that as a general rule more discretion as to the mode of cropping arable land should be given to the occupier than appears to be usual in existing agreements and leases.

“ That the ordinary obligations of a tenant include the following points :—

1. That wherever he quits his farm he shall leave it clean in an agricultural sense.
2. That he shall also leave the land in such a state as to tillage as not to cause loss in cultivation for the next crop.
3. These two obligations ought to be indispensable in all cases and without reference to the state of the commencement of the tenancy.

“ That there are corresponding obligations incumbent on the landlord towards an outgoing tenant, viz., to reimburse the tenant :

1. For crops in the land.
2. For preparation for ensuing crops, but only for such as should be performed in the usual course of good husbandry.
3. For purchased manure in the ground (a certain proportion of the cost).
4. For purchased food consumed on the premises by cattle, sheep, and pigs within a limited period before the expiration of the tenancy (a certain proportion of the cost).

N.B. It is desirable that these items 3, 4, should be matter of special agreement between landlord and tenant.”

The motion was put to the vote, and on a division being taken it was not carried.

The further consideration of the Report of the Committee was adjourned to the next Meeting of the Committee.

Fourth Meeting of Committee, Exeter, 22nd January, 1859.

Present.

C. GORDON, Chairman.	T. HUSSEY.
T. D. ACLAND.	I. E. KNOLLYS.
T. DANGER.	H. ST. JOHN MAULE.
J. DAW.	R. MAY.
R. DYMOND.	G. S. POOLE.
MARK FARRANT.	J. TYRRELL.
W. HOOPER.	W. WIPPELL.

The Committee entered upon the consideration of the Resolutions forming the summary of the Draft Report prepared by Mr. Acland. Several amendments were agreed to, and it was Resolved, *nem. con.*, to report the Resolutions as amended to the Council.

RESOLUTIONS AS SUBMITTED TO THE COMMITTEE.

The phrases altered in Committee are indicated by brackets. Additions are indicated thus [A].

1st. That it is desirable that [Agreements] between Landlord and Tenant should be reduced to writing, and signed before the entry of the Tenant on the land.

2nd. That the basis of such [agreements] should be one of mutual security to landlord and tenant:—

A. *In favour of the Tenant.*—Security that if he farms the estate up to the expiration of the tenancy, as if he were going to continue in the occupation, he shall not be called upon to leave capital, from which he has not had time to [receive] a fair [probable] return himself, [for the benefit of his successor,] without being paid for it.

B. *In favour of the Landlord.*—Security that, [if he allows his tenant to receive money for the crops and manure he leaves behind, and for acts of husbandry performed for succeeding crops, any] damage done to the [estate] by foulness, or [other] bad management, will be a charge against the outgoing tenant, [to be deducted as a set-off from any amount he may set up as his claim for compensation.]

3rd. That cultivation clauses [be inserted in a separate schedule, appended to the agreement, and leave as much discretion as possible to the tenant.]

4th. That [A] restrictive clauses, [when] necessary, should [A] carry [their own] penalties [within themselves,] so as to be capable of enforcement without [resort to proceedings at law for] damages.

5th. That no claim for compensation on the ground of having made a farm clean be [allowed.]

6th. That ordinary claims [on the in-coming tenant] be limited to crops in the ground and acts of husbandry [done according to the *best practice* in husbandry.]

7th. That in [the interpretation of the best practice in husbandry,] the usual "custom of the country" be specially [excluded.]

8th. That claims for compensation for purchased manure, [A] purchased food, [corn consumed, &c.,] be matter of special agreement, under which compensation is not to be claimed, without [A] definite notice given, and consent obtained from the landlord or his agent.

9th. That claims for any special outlay in permanent improvements—such as draining, fencing, road-making, [&c.]—be in like manner made in the form of a definite sum, spread over a given number of years, after [A] notice given and consent obtained as in the last case.

Mr. Acland was requested to insert certain further suggestions in the Draft Report, and to lay the same before the Council at its next Meeting, to be then dealt with as the Council might decide.

RESOLUTIONS AS AMENDED BY THE COMMITTEE

ON THE 22ND JANUARY, 1859.

BEING

THE REPORT OF THE COMMITTEE.

1st. That it is desirable that terms of arrangement between Landlord and Tenant should be reduced to writing and signed before the entry of the Tenant on the land.

2nd. That the basis of such arrangements should be one of mutual security to landlord and tenant:—

A. *In favour of the Tenant.*—Security that if he farms the estate up to the expiration of the tenancy, as if he were going to continue in the occupation, he shall not be called upon to leave capital beneficial to his successor, from which he has not had time to obtain a fair return himself, without being paid for it.

B. *In favour of the Landlord.*—Security that, on the other hand, any permanent or temporary damage done to the farm by foulness or bad management, will be a charge against the outgoing tenant.

3rd. That cultivation clauses should not needlessly restrict the tenant as to the succession of his crops.

4th. That such restrictive clauses as may be necessary should, as far as practicable, carry definite penalties, by way of additional rent, so as to be capable of enforcement without the necessity of resorting to legal proceedings to assess damages.

5th. That no claim for compensation on the ground of having made a farm clean be entertained.

6th. That ordinary claims on the part of the out-going tenant be limited to crops in the ground and acts of husbandry, to be estimated according to their value to the in-coming tenant.

7th. That in making arrangements between Landlord and Tenant, the usual "custom of the country" be specially barred.

8th. That claims for compensation for purchased manure or purchased food be matter of special agreement, under which compensation is not to be claimed, without previous definite notice given, and consent obtained from the landlord or his agent.

9th. That claims for any special outlay in permanent improvements—such as draining, fencing, road-making, or building—be in like manner made in the form of a definite sum, spread over a given number of years, after previous notice given and consent obtained, as in the last case.

[The following is the Draft Report referred to in the proceedings of the Committee (page xiii). It was circulated among the several Members of the Committee in March, 1858, and sent to every Member of the Council previously to the Council Meeting of the 26th February, 1859. It has received very careful revision, and considerable modification in consequence of various suggestions: it may therefore be taken as embodying the views of a certain number of individuals who have given their attention to the subject of the Resolutions which constitute the actual Report of the Collective Committee as agreed to on the 22nd January.]

DRAFT REPORT

PREPARED BY MR. ACLAND IN COMPLIANCE WITH THE ORDER
OF THE COMMITTEE AT ITS SECOND MEETING, AND
AMENDED FROM TIME TO TIME SUBSEQUENTLY.

THE Committee understand it to be assumed in the Resolution under which they were instructed to act, that many farms in the West of England are held on terms unsuited to the present state of agriculture. They have accordingly deemed it unnecessary to collect evidence to establish a fact which may be dealt with as notorious.

They have obtained from Members of the Committee and from other sources suggestions as to the points which, in the opinion of some of the best farmers, ought to be provided for; and have been furnished with forms of agreement already adopted on some estates which have the reputation of being well managed, and of being occupied by men of respectability and capital.

The Committee are unanimously of opinion that the Council may render great public service by publishing some suggestions as to the principles on which the owners and occupiers may best protect their respective interests, with a view to encourage the expenditure of capital on land, and to prevent litigation.

The Council is composed in a manner which gives it peculiar advantages for the task which, by the appointment of this Committee, it has undertaken. In addition to a large number of vice-presidents, who are summoned only when they specially desire it, the Members of Council who regularly or frequently attend at

the monthly meetings are not fewer than forty,* including, in not very different proportions, owners or representatives of large properties, owners of estates of moderate size farmed in some cases by the owners themselves, tenant-farmers, and professional agents. They have had the advantage of acting harmoniously together for several years, and of enjoying, as they believe, the confidence of a large body of Members; they have great facilities for knowing what is wanted in different quarters, and for taking a dispassionate view of the various interests involved.

The Committee think, nevertheless, that the Council in offering its suggestions should avoid even the appearance of a disposition to dictate a form of lease or other agreement, and confine itself to recommendations of general principles, to be worked out in detail by others. Such recommendations, having been carefully framed on a full consideration of the real interests of the several parties concerned, may safely be committed to the calm and patient judgment of landlords and tenants. The discussion of the advice given cannot fail to produce a gradual and beneficial effect on public opinion.

It may not be too much to anticipate that courts of law, which have gradually adapted their decisions, so far as the law permits, to the expanding wants of the community, may in time recognise in the recommendations of this and similar societies a safer guide to the interpretation of the term "good husbandry" than is afforded by what is called, though most fallaciously, the "custom of the country." Without discussing here the question how far it is reasonable to apply to any progressive art the restrictions of legal custom—even in the qualified sense in which that term is construed with reference to agriculture—it may safely be asserted that efforts are now needed to establish a standard of husbandry more in accordance with the best farming of the present day. As matters now stand, injustice on one side, and slovenly farming on the other, are sheltered under obsolete traditions, and tend to uphold by obstinate persistency arrangements suited only to a bygone state of things.

Your Committee recommend, as the first step towards a better

* It is worthy of observation, that thirty-seven Members of the Council were present on the 26th February, 1859, when the Report of the Committee was taken into consideration.

arrangement between landlord and tenant, having for its object to encourage good farming, and to discourage bad farming, "*that every arrangement for letting land should be reduced to writing.*"

Some of the reasons for this first recommendation are forcibly stated by G. Wingrove Cooke, Esq., in the following extract from a work on 'Agricultural Tenancies,' to which the Committee have been indebted for much valuable information: *—

"Written contracts, whether in the form of agreements or leases, are grown into more general, but still not into very general use throughout the kingdom. The ordinary class of farmer—with not too much capital, no exuberant enterprise, and little confidence in new systems, but with considerable shrewdness and great talent for bargaining—prefers the elasticity of a parole contract. Reductions of rent, allowances for improvements, and the lax culture obligations of the custom of the country, are all opportunities for constant haggling; and, unless the agent be a very shrewd, hard man, for constant petty victories. No wonder that a simple verbal tenancy is preferred by this class to security for improvements they never intend to make, and covenants for good husbandry precisely defined.

"Gradually, however, cunning must give place to wisdom; and this class of farmers must surrender to strangers, or must be succeeded by sons, who have learned the necessity of an exact demarcation of their rights and obligations. Little advantages given, small reductions, occasional allowances, are as nothing when compared with the vast yearly difference of produce raised from the same land by a farmer who drains and highly manures and a farmer who does not. Yet he must be too improvident a man to be a good farmer who should invest in the land capital sufficient for high cultivation, without some security that a change in the ownership of the estate (whatever well-founded confidence he may have in the present landlord) may not at any moment bring a notice to give up farm, improvements, and capital, and leave it all, uncompensated, to a stranger. If the modern system of husbandry is to progress until it becomes universal, precise written contracts must extend over the land with an equal pace."

It is not desirable, in the opinion of your Committee, that the Council should enter upon the comparative merits of leases for a term of years and of leases from year to year, but it appears

* 'A Treatise on the Law and Practice of Agricultural Tenancies, with Forms and Precedents,' by George Wingrove Cooke, of the Middle Temple, Barrister-at-Law. London, 1850. Preface, p. iii.

quite within their province to point out the evil consequences of reducing to writing the arrangement between landlord and tenant in the form of an unstamped agreement for a lease. This form of agreement gives up the freedom of tenancy-at-will, without securing to either party the advantages of a well-drawn written document. It is not generally known that (owing in great measure to the representations made by a member of this Committee to a member of the Government, himself a West-countryman) a great reduction took place in 1850* in the stamp duty on leases, so that the stamp on a lease for less than 35 years for a farm of 100*l.* a-year is now only 10*s.* The Committee do not scruple to call the attention of landlords to the great importance of adopting the form of a stamped lease, whether for a term or from year to year. If this be not done it would be better to rely on a verbal agreement, and to have no written form at all.

With regard to the conditions to be inserted in leases when granted, your Committee do not recommend the Council to publish any model clauses or common forms. The legal questions involved in covenants having for their objects the reservation and protection of the rights of ownership may be safely left to professional men. The Committee, however, would advise that, in any written instrument for the letting of land, the purely agricultural covenants should be expressed in the shortest and plainest possible language; and that a schedule of the buildings and various parcels of lands should be added, specifying the agricultural description of each field, whether pasture, tillage, or other, at the time the agreement is signed.

Your Committee have confined themselves as far as possible to matters within their province as members of a society for the encouragement of agriculture, and especially to the two following questions:—

1st. On what principle should covenants be drawn with a view to promote good cultivation during the occupation of a farm?

2nd. What are the mutual obligations of a Landlord and a Tenant on the expiration of a Tenant's Term?

Covenants to be observed during Occupation.

Under this head arises the question, "Which is the best time

* By the passing of the Act 13 & 14 Vict. c. 97.

of entry?" On this subject opinions are now divided, as they have, in past times, been modified by the course of agricultural improvement. From one of their informants your Committee learn that, in early times, a desire for lands suitable for the growth of rye and wheat led to the adoption of a Michaelmas entry as most convenient for the sowing of those crops, and for the abandonment of other lands which have yielded their return. This view is supported by the prevalence of autumn entries in the oldest wheat-growing districts.

The same informant states that, with the introduction of the turnip-crop, a new era sprang up; that the desire on the part of tenants to prepare their own fallows led to an increased demand for Spring entries. Some strong arguments are also urged in favour of Spring entry, as most suited to lands in which dairy business, grass, or apples form an important element in the farmer's returns.

On the other hand, it is contended by a writer in the last number of the 'Royal Agricultural Journal' that, on farms of an ordinary mixed character, the recent extension of autumn cultivation has introduced elements into British farming which should outweigh other considerations, and he consequently gives a decided preference to autumnal entry as the rule which ought to prevail under present circumstances.

The Committee therefore think that it is undesirable for the Council to recommend any period of entry, as no one time can be generally suitable for farms in the West of England; but the successive changes of opinion just referred to afford a striking illustration of the inexpediency of imposing shackles on the progress of agriculture by adherence to antiquated forms.

With regard to cultivation-clauses, your Committee recommend that, in all cases where the tenant is presumed to be a man of capital, it is desirable that more discretion as to the cropping of arable land should be vested in his hands than appears to be usual in existing agreements.

It is well known that in many leases the exact rotation of crops to be followed year by year is minutely laid down and surrounded by restrictions rendering it impossible for a tenant to adopt the best farming of his neighbourhood without involving himself in the risks attendant on a breach of covenant.

The Committee do not think that the Council would advance

the cause they have at heart by recommending any general regulations as to rotations of crops. They have come to this conclusion for several reasons.

In the first place, no one system will apply generally. If restrictions on the freedom of the tenant are required—which without doubt in certain cases they are— they will not be the same for arable, grazing, and dairy farms, nor for heavy and light lands.

In the next place, they are of opinion that, in the present state of agriculture, it is unreasonable to clog a lease for twenty years with conditions proceeding on assumptions which the progress of improvements in cultivation and in manures renders every year more open to debate and question. Even in cases where a system is laid down, any relaxation sanctioned by the lessor should be made binding on his heirs and successors, that it may not be withdrawn suddenly, to the vexation of the tenant.

One suggestion, however, has been strongly pressed on the Committee, which appears in the present state of agricultural knowledge to be well deserving of consideration, and to be supported by the results of considerable experience. The suggestion is, that in lieu of a particular *succession of crops*, or rotation of crops, the lease should bind the tenant to leave in each year a certain *proportion of green crop* on the arable land to be consumed on the premises. This principle properly applied to the various soils on the farm may be capable of securing the farm to a considerable extent from impoverishment, without unreasonably fettering the discretion of the tenant.

But, thirdly, the Committee are persuaded that there is only one way to prevent tenants exhausting, as far as it is in their power to exhaust, the fertility of the soil; and that is, to make it their pecuniary interest to leave the land generally in good condition, with a fair proportion of well-cleaned root-crops.

The course of the inquiry thus leads your Committee to what they conceive to be the key to the whole question referred to their consideration, viz. :—

The Mutual Obligations of a Landlord and Tenant on the Expiration of a Tenancy.

In other words, “What are the obligations under which respectively a tenant lies when he delivers up, and a landlord when he resumes, possession of a farm?”

That there are such obligations on either side will not be denied ; that they are the same now as they were formerly, will not be maintained by any one who considers the changes which have been gradually introduced into the general relation between landlord and tenant.

The general principle of the English law is thus stated by Mr. Wingrove Cooke:—

“The tenancy from year to year arises wherever a landlord lets lands, and a tenant takes them, without stipulation as to the duration of the tenancy. It is the construction which the law puts on the fact of the relation between landlord and tenant, unless there be some particular agreement between the parties to the contrary.

“Formerly, such tenancies were thought to be tenancies at will ; but *as it was found to be extremely inconvenient and unjust that a tenant who occupied land should, after he had sown it, be turned out of possession without reasonable notice to quit*, it was held that a general occupation was an occupation from year to year, and that the tenant should not be turned out of possession without reasonable notice to quit. This reasonable notice, in the absence of any express agreement upon the subject, is settled to be half a year’s notice, and it must expire at the period of the year at which the tenancy commences.”*

It appears further, that the law of England, even where no conditions are mentioned, annexes to the relation of landlord and tenant certain rights and obligations ;† for instance, it implies on the part of the landlord that he will give quiet enjoyment to his tenant, and on the part of the tenant a promise to manage the farm in a husbandlike manner ; but when the question is asked, What is a husbandlike manner ? the answer is to be sought in the customs of the district in which the farm is situated.‡

On the other hand, a great Judge once laid down the principle, in reference to a way-going crop, “The custom is just, for he who sows ought to reap, and it is for the benefit and encouragement of agriculture. It is indeed against the general rule of law concerning emblements which are not allowed to tenants who know when their term is to cease, because it is held to be their fault to have sown when they knew their interest would expire before they could reap ; but the custom of a *parti-*

* Wingrove Cooke, p. 5.

† *Ib.*, p. 12.

‡ *Ib.*, p. 46.

cular place may rectify what otherwise would be *imprudence and folly*.” *

But this encouragement to agriculture is limited by the local custom, and no provision is made by the law, in the absence of a written agreement, as far as your Committee have been able to learn, by which an outgoing tenant can secure to himself a reasonable share of the benefit which he has laid up in store for *future crops*.

It is clear that if a tenant is only to reap a return for what he has sown within his last year, and if he is liable to be interrupted in the course of his operations by a six months' notice, those operations cannot be carried on with that far-sighted enterprise which modern farming requires.

It appears therefore that the law, while it jealously guards the owner of property from waste, also recognizes the claim of the tenant to reap the fruits of his own labour and seed ; but by calling to its aid the local custom as the interpreter of good husbandry, and by assigning a practical limit to the period over which the calculations of the farmer are to run with a view to a return for his outlay, the law virtually burdens the land which it means to protect, and leaves the farmer open to the charge of “*imprudence and folly*” if he leaves an expensively-grown crop of turnips on the land, or a yard full of dung made by cattle fed on oil-cake.

The Committee think the remedy is to be found in a more extended construction of the mutual obligations of landlord and tenant.

In the first place it may be observed that the relation of landlord and tenant is a matter of contract, and the terms of the contract are liable to be affected in each particular case by many circumstances ; as for instance, by the length or permanence of the tenure, the amount of capital laid out on the farm by the landlord or by the tenant, the amount of the rent, not to mention local peculiarities affecting the personal comfort and feelings of either party.

But after making allowance for all attendant and modifying circumstances, there are some general principles to be deduced from the actual practice of landlords and tenants in districts in which farming has advanced to its highest perfection.

* Wingrove Cooke, p. 44.

These general principles rest for their support on the following facts :—That Agricultural operations, including tillage, cattle feeding, and manuring, require a considerable period for their full development ; That capital must be invested in the ordinary process of good farming, which does not yield its full commercial profit under two or even four years, and once sunk in the land it is irremovable. Either, therefore, the farmer must be able to reckon with confidence that a sufficient time will be allowed for him to reap when he has sown *and manured*, or that he will be paid by the incoming tenant the value of what he leaves for the future benefit of his successor ; or, failing both these suppositions, the natural consequence follows that it may be “ imprudence and folly ” to invest capital in the land from which no return can be relied upon. It follows as a further consequence that the owner, the occupier, the labourer, and the consumer suffer by the produce of the land being less than it might be under good farming.

On the other hand, it is alike reasonable and expedient that a landlord who lets his land to a tenant should secure himself against injury to his property ; and landlords not unnaturally view with distrust and alarm schemes of compensation, which may burden their property with indefinite charges, and give to the owner no adequate security against serious damage to his property arising from neglect or fraud. It is notorious that a mere right of action against an outgoing tenant for breach of covenants, founded on the custom of the country, is worthless as security to the landlord.

The remedies which your Committee propose for these evils are—

First. To define more clearly the obligations of tenants.

Second. To encourage tenants to farm well, by enabling them to obtain repayment for the crops and manure they leave behind them, when they leave their farms in consequence of notice from the landlord.

Third. To protect both landlords and tenants by covenants capable of being easily enforced.

First. The Committee are of opinion that before a tenant can establish any claim to be reimbursed for what he leaves in or on

the land, he should be in a condition to prove that he has fulfilled his ordinary obligations. These obligations include the following points* :—

1. When an outgoing tenant quits his farm he is bound to leave it free from weeds [understanding by weeds not annuals, but perennials].

2. He is bound to leave the land in such a state as to tillage as not to cause loss in cultivation for the next crop. [This includes such cases as bad or inefficient ploughing, or ploughing at an improper time.]

3. These two obligations ought to be indispensable in all cases, and without reference to the state of the farm at the commencement of the tenancy.

The Committee attach great importance to the last words, as they cut at the root of all pretence to make ordinary clean farming a ground of claim for compensation. If a man takes a foul farm, he either takes it at a lower rent, or sees his way to repay himself in time for the expense of getting it clean. The expense is undeniable, but this is a matter to be settled before coming in, not on going out.

If legal forms can be devised to give effect to these suggestions for protecting landlords against the damage that may be done to their estates by bad farming, landowners will manifest less reluctance to offer encouragement to good farmers by the recognition of the landlord's obligations.

For, *Secondly*, in the opinion of your Committee, there are corresponding obligations equitably incumbent on a landlord towards an outgoing tenant who has fulfilled his side of the agreement.†

* It will be observed that the paragraphs 1, 2, 3, are copied *verbatim* from resolutions passed unanimously at the second meeting of the Committee in February, 1858, a majority of the members present being, or having been, tenant farmers. A slight alteration in the wording of No. 1 was introduced at the third meeting of the Committee.

† I have thought it better to leave the following paragraphs as founded on the resolutions of the Committee at its second meeting, and on the revision of several members of the Committee before the fourth meeting of the Committee, the resolutions of which, forming the authoritative Report of the Committee, speak for themselves.—T. D. A., JUN.

1. To reimburse the outgoing tenant for crops on the land.
2. To reimburse the outgoing tenant for preparation for ensuing crops, *such as should be performed in the usual course of the best husbandry*. [The limitation is intended to prevent tenants claiming heavy payments for injudicious acts of husbandry, as for instance, for three ploughings when one at the right time would have cost less and done more good.]
3. To reimburse the tenant for a portion of the cost of the purchased manure left in the ground.
4. To reimburse the tenant for a portion of the cost of purchased food consumed on the premises within a limited period by cattle, sheep, and pigs.
5. To reimburse the tenant for permanent improvements for which he has not had time to [repay himself] reap the benefit.

In the opinion of the Committee, the items 1 and 2 ought to be matters of course, to be confidently reckoned on by every farmer. But the principle on which the money payments for crops in the ground and acts of husbandry are to be fixed, should be clearly defined. Green crops should not be valued at what they would fetch if removed elsewhere, but at what is called a consuming price; and crops and acts of husbandry generally should be taken, not at what they may happen to have cost, but at what they are really worth to the succeeding occupier. Otherwise, bad management would often pay the outgoing tenant best, and the incoming tenant would have to take a poor crop of turnips at a higher price than it ought to have cost to insure a good crop.

The items 3, 4, 5, will perhaps, in practice, be better reserved as matter for special agreement, which need not be entered into until mutual confidence shall have been established, and which can be withheld if, at any subsequent period, that confidence shall be shaken.

It is needless to point out how the suggestions of the Committee would tend to remove many of the inconveniences attendant on the tenant holding possession of some of the land after the expiration of the tenancy, for the purpose of taking what is commonly called a way-going or off-going crop. The Committee think it highly desirable that in all cases such arrangements

should be entered into as would supersede, as far as possible, any necessity for the continued occupation of any part of the premises by the outgoing tenant after the expiration of his term.

As to the question of pre-entry for cultivation—if a Michaelmas entry be adopted, much difficulty is removed. But the following clause, adopted in one of the agreements submitted to the Committee, appears to meet the requirements of the case by giving the landlord and the incoming tenant the right to take the direction or performance of the acts of husbandry for succeeding crops into their own hands if they have reason to distrust the outgoing tenant:—

“The Landlord, on giving notice in writing, is to have the power, during the last year of the Tenancy, to enter upon and prepare the fallows; or he may direct the Tenant how the fallows shall be prepared; or he may empower the next incoming Tenant to prepare such fallows; but if no such notice shall be given, then the outgoing Tenant shall clean and plant the land as if his tenancy continued.”

The *third* point, namely, the importance of covenants capable of being easily enforced, has been partly disposed of already in the remarks on “covenants to be observed during occupation.” It may, however, be remarked generally, that in suggesting that a greater degree of liberty should be given to tenants, the Committee are well aware that restrictions varying according to circumstances must frequently be required.

The Committee wish, however, to impress strongly on the Council that, if they should decide to recommend less restrictive and more encouraging arrangements with tenants as more suited to the present wants of agriculture, it must be made quite clear that they do not propose to burthen landed property with indefinite incumbrances placed beyond the control of the owners of the soil, and that clean farming and good tillage are presumed to be a matter of course; any deviation from these paramount obligations being a set-off* to any claim for compensation set up by a tenant: and while in the case of restrictive clauses, as in the case of cultivation clauses, the Committee abstain from expressing

* Not only a set-off, but an independent charge. See Resolution 2nd, B, in the Report of the Committee, p. xv.—T. D. A.

an opinion as to what are and what are not desirable,—they recommend that one general principle should run through them all, viz. That they should as far as possible, by a declaration of the penalties incurred, avoid the necessity for an appeal to a jury to assess damages; and that the penalty, if pecuniary, should be liable to be recovered in the same manner as rent, or to be deducted out of the allowances made by way of compensations for crops, manures, acts of husbandry, or improvements.

Two principles are most important to the successful and equitable working of the system recommended:—

1st. That no outlay by a tenant shall be chargeable on an estate without notice given to the owner, and the written consent of himself or his agent.

2nd. That the precise sum chargeable, and the number of years over which it is to be spread until it altogether ceases, shall be named beforehand, so that little or nothing need be left to subsequent valuation.

Cases may undoubtedly occur in which the aid of professional valuers must be called in: if, however, the suggestions of the Committee were adopted, and proper covenants made in the lease or agreement, these matters would, in the majority of cases, be amicably settled between the outgoing and the incoming tenant.

The Committee have not thought it necessary to make any recommendation on the subject of the appointment of arbitrators; but the attention of landowners should be given to devise some better method of selecting the third umpire than that which commonly prevails, of leaving it to be decided by a chance throw. It may not be amiss to refer to an arrangement adopted on a large property in the West of England, which is stated to work well:—"In case the two valuers shall disagree, the matter in dispute shall be determined by an umpire, to be named by the Clerk of the Peace for the county of ——." Whether this is the best possible arrangement; whether it may be open to the objection that the Clerk of the Peace may decline to perform the duty assigned to him, your Committee are not prepared to decide; but there can be little doubt that an appointment of an umpire by some authority independent of the valuers appointed on either side, is much to be desired; and

in the further deliberations to which this Report may lead, the Council may perhaps be able to render some assistance to the agricultural community by pointing out some means of securing, when required, the aid of surveyors of established character and independence.

Your Committee, in conclusion, sum up as follows their recommendations :—

[*Here followed in the Draft the Resolutions considered and passed with Amendments on the 22nd January, 1859—see p. xvii.*]

COUNCIL MEETING, 29th January, 1859.

THE Report of the Covenants and Customs Committee, together with the proceedings of the Committee, and a Draft Report prepared in compliance with the instructions of the Committee, were laid on the table, and ordered to be taken into consideration at the next meeting of the Council.

COUNCIL MEETING, 26th February, 1859.

ON the Report of the Covenants and Customs Committee being brought up by Mr. Gordon, the Chairman of the Committee,

Resolved,—

That the Report as presented by Mr. Gordon be printed in the Journal, without any expression of the opinion of the Council thereon.

That the other documents which accompany the said Report be referred to the Journal Committee for publication, on the same understanding.

MEMORANDUM

ON THE

EXHIBITION OF ARTS AND MANUFACTURES AT BARNSTAPLE IN JUNE, 1859.

At a Meeting of the Council held on the 15th January, 1859, it was Resolved:—

That a Committee be appointed to carry into effect the extension of the Exhibition at Barnstaple to Arts and Manufactures, with reference to a Memorandum drawn up by Mr. Acland, and now in the hands of the Council.

Memorandum, &c.

(1.) THE fact that the Council of the Bath and West of England Society propose to expand the scope of their Exhibition at Barnstaple in 1859, so as to include Manufactures and the Arts, in addition to Agriculture, has been made public by means of a letter published in the Journal of the Society of Arts in London.*

By the favour of the Editors of the Local Press this letter has been extensively circulated through the West of England.

In order to supply the consequent demand for more detailed information, I have drawn up the following explanation of the enlarged objects of the Society, with some suggestions as to the mode of carrying them into effect.

GENERAL OBJECTS OF THE SOCIETY.

(2.) It may be right, for the sake of those who may be unacquainted with the facts, to premise that the Bath and West of England Society was founded in 1777 *for the Encouragement of Agriculture, Arts, Manufactures, and Commerce*, and that it continued, chiefly as an Agricultural Society, at Bath till the year 1851, when it was remodelled and assumed a migratory character, having for its area the counties of Cornwall, Devon, Somerset, with portions of the conterminous counties of Dorset,

* The letter is reprinted below, p. xli.

Wilts, and Gloucester. Commencing at Taunton in 1852, it has held seven meetings in successive years; each year gaining ground in public estimation, and in the practical character of its internal management.

The inhabitants of Plymouth, Bath, Tiverton, Yeovil, and Newton, have each tried to outdo their predecessors in their preparations for the reception of the Society. The visit to Cardiff in 1858, by special invitation, was most successful. A subscription, hitherto unprecedented, has been raised for the North Devon Meeting in 1859. Dorchester has made good its claim for 1860. West Cornwall looms in the distance for 1861.

(3.) With such evidence of local interest in the operations of the Society, it is incumbent on the Council to do all that lies in their power to sustain its character for efficiency, and if possible to add to the utility and interest of its annual meeting. It is needless to enlarge on the value of the opportunity afforded by an assemblage of from 15,000 to 20,000 persons for the interchange of ideas, or for the transaction of business, or to prove that whatever tends to refine or elevate the minds of the visitors on such an occasion is worth the effort which it may cost.

(4.) We have every prospect of an excellent meeting at Barnstaple. The interest in the exhibition of live stock continues unabated. Beautiful living creatures always attract the public. It will not be the fault of the North Devon men if the exhibition of the West of England cattle does not surpass that of any former collection.

The agricultural implements exhibited increased in number from 400 in 1852 to 1100 in 1857. What is more important, the practical character of the implements has steadily improved, and the attendance of exhibitors from counties beyond the district of the Society has increased from 16 to above 40, including nearly all the principal firms in the North and East of England. In consequence of recent changes a still further improvement both in numbers and quality is expected in 1859.

The general management of the Society has elicited the warmest expressions of approbation from the exhibitors and other attendants at the annual meeting; and the increasing number of visitors, including a large proportion of ladies, has led to the exhibition of many articles not directly agricultural, with a view to advertisement and sale.

(5.) From these and other circumstances pointing in the like direction, the Council may justly anticipate that they will receive public support and efficient co-operation in well-considered plans for making the Society more generally useful with the following objects in view.

OBJECTS OF THE EXTENDED EXHIBITION.

I. To encourage ordinary trade by bringing the manufacturer into contact with a large body of customers spread over an extensive district, which contains varied resources, and has rapidly improved in its agriculture.

II. To give an opportunity, not furnished by the ordinary agencies of retail trade, for introducing into a peninsular quarter of England, remote from the metropolis and from the great seats of manufacture, improvements in the arts, whether mechanical, useful, or ornamental.

III. To facilitate the disposal of the products of local industry or talent.

(6.) In deciding on the practical measures to be taken for the gradual promotion of these objects, two courses lie open for choice :—

Either to endeavour to arrest public attention by a large and imposing collection of objects of interest ;

Or, to begin on a scale commensurate with the means already at command, looking forward to further expansion if called for by the wants of the community.

Whatever arguments might be urged for or against the larger scheme, the more modest attempt has at least one merit. It involves the smallest risk, and springs more naturally out of the actual working of plans which have stood the test of experience. It has been often said that things in England are not made at once, they grow : and growth at the same time proves and sustains life.

It seems, therefore, desirable that in the first instance some caution should be exercised in the invitation issued to exhibitors ; and that practical utility, excellence in quality, and manageable compass of the entire exhibition are to be preferred to an extensive assortment of articles.

CLASSIFICATION OF ARTICLES TO BE EXHIBITED.

(7.) An elaborate classification, founded on scientific principles, is not required. A few leading divisions will suffice to show what kind of articles will have to be provided for in the show-yard.

A. *Agricultural Implements*, strictly so called, may be displayed as heretofore, with the addition of some conveniences for exhibition of machinery in motion. A number of articles, formerly included under the head “ *Miscellaneous*,” will more conveniently be distributed under some of the following heads :—

B. *Mechanical Department*.—Inventions for the saving of labour; for locomotion; appliances for construction or for engineering purposes; tools of various kinds. These are all, more or less, cognate to the agricultural machinery. Under this head may be included carriages and harness.

C. *The Scientific Department* will probably not be large. Chemical manures have formed an important element in former exhibitions. Further applications of Chemistry to the arts may now find a place. Scientific apparatus, hitherto confined to barometers, lactometers, &c., may now comprise microscopes and photographic appliances; and under the same head may be ranged watches and clocks, and other instruments for delicate use: perhaps also specimens of bookbinding, and cheap books.

D. *The Domestic or Economical Department* may include, as heretofore, stoves, cooking-apparatus, dairy utensils. We may now expect a considerable addition in the form of pottery, glass, table-furniture, and appliances for lighting. Under all these heads kind and encouraging promises have been already received from firms of the highest repute in England. Cabinet work and furniture, on account of its bulk and liability to injury, and also on account of the small chance of sale if it be well made and costly, cannot be expected from great distances.

So far as the element of design enters into consideration, and questions of taste become involved, the 4th department comes into close contact with another department, which it is most desirable to include in the Exhibition, namely,

E. *The Artistic Department*.—The suggestion of a joint exhibition of cattle and pictures, and still more of china, on the same ground, may provoke a smile. But, in the first place, experience has proved that the increase of objects of interest in our show-yard does, in fact, widen the circle of persons interested in our proceedings, and, on the other hand, that those who acted together at first only to improve Agriculture, have been led to co-operate for other and not less important objects of an intellectual character. In the next place, while it is admitted that Agriculture is now closely connected with scientific and mechanical progress, it is not less certain that the prosperity of England in many branches of the Mechanical Arts is becoming more and more closely connected with a knowledge of the principles of higher Art, and more dependent on the skill of the artist. The proof of this is to be found in the great efforts made by manufacturers to command the highest artistic talent, and in the support which is given to schools for teaching Design and Drawing.

One of the first steps to be taken towards improving the general standard of taste in Manufactures is to make a popular appeal to

the eye and imagination through the Fine Arts. It may be hoped that, apart from any considerations of personal advantage, the eminent artists who are natives of the West, or who reside within the area of the Society's operations, will be disposed to aid in the present effort for the good of this part of the country, and will add to the attractions of the Barnstaple meeting, by contributing some of their works, provided that they are satisfied that the responsibility for admission and safe custody of works of art is placed in proper hands.

In addition to the articles of ornamental design already enumerated under department D, we may therefore expect, in the *Artistic Department*,

Architectural Designs.
Models, Casts, and Carvings.
Drawings.
Engravings.
Photographs.

(8.) There is one large department of British industry which has not yet been named, viz. Clothing, from the cheapest calico to the most expensive silk or cloth. Experience will show whether the exhibition of new materials or patterns in these branches will benefit the manufacturers or the public.

It may admit of a question whether the pressing demand for cheap clothing among the masses, and the restless craving for novelty among the votaries of fashion, are not, in fact, rapidly met by a corresponding supply from the manufacturers through the retail shops. The exhibition of textile fabrics, moreover, would require considerable space and special arrangements, and whatever is worth doing in this way may probably be done by patterns in the Artistic Department.

With regard however to manufactures which are carried on in the West, it is not improbable that some of the establishments which have a peculiar character of their own may be disposed to support the honour of the West by the display of their goods. This may apply especially to woollens, lace, silk, and gloves. Welsh flannels were exhibited by several makers at Cardiff.

(9.) On a review of the five departments enumerated above, those who are familiar with our show-yard will observe that the four first are, in fact, little more than expansions of sections represented in the former prize lists, and include articles which it has needed no prize to bring under the canvas of the Society's sheds, because the prospect of sale alone afforded a sufficient inducement to attract the dealers in such articles. The existing organization of the Society, with a little addition, will probably

suffice to provide for the exhibition of all that comes under the designation of "simply useful" in the four first departments.

Special arrangements will be required only for so much of those four divisions, A, B, C, D, as fall under the designations of "*Delicate*," "*Precious*," or "*Ornamental*," and for "*Works of Art*" in the 5th department, E.

The practical conclusion as to the arrangement of the show will be found below (§ 14).

GENERAL REGULATIONS AND CONDITIONS.

(10.) The general arrangements suggested by a Committee for the exhibition of agricultural implements and of works of art and industry, on the footing of a mart or bazaar for the transaction of business, are detailed in the "Draft Regulations," printed for private circulation, in order that they may be fully considered before they are finally adopted by the Council.

The following is the substance of those which bear upon our present subject:—

That the Council will not be responsible for the safe keeping of any article exhibited, but will require Exhibitors to take charge of their own property.

That ordinary shedding made of canvas of the best quality, covering a width of 20 feet, 7 feet high at the eaves, with open sides, will be provided for Exhibitors giving due notice of their wants, on payment of 2s. per foot run.

That special shedding of greater height for the exhibition of machinery in motion will be provided in separate compartments covering 20 feet by 14, and that ground will be appropriated to Exhibitors desirous of erecting their own buildings, at 6d. per square yard.

That enclosed shedding, for the Exhibition of Works of Art and Industry requiring such protection, may be provided at the rate of 3s. 6d. per foot run of 20 feet wide. Such shedding will have boarded sides and canvas of the best quality.*

Provision is made for the due specification, numbering, and cataloguing of all articles entered; for the levy of a fine *ad valorem* on articles entered but not exhibited; and for the authority of the Council over all persons and articles entering the yard.

The exhibition is to be held in an enclosed yard covering about 15 acres of ground; and although the Society does not make itself responsible for the custody of the property exhibited, the most vigilant precautions are in fact adopted, by day and by night, in conjunction with the police authorities.

* This must not be considered as covering the cost of protection in the Artistic Department. (See below, § 14.)

(11.) From what has been said it is manifest that space is abundant; that articles not specially frail in texture may be sheltered from the inclemency of the weather; and that articles of value may be protected by the exercise of due care on the part of the owner or his representative;—and further, that in cases in which the Exhibition is worth resorting to for trade purposes, the charges for covering and protection are not a very heavy addition to the cost of transit and attendance.

It may be added that the principal railways have hitherto been liberal in their dealings with the Exhibitors; and that it is a real pleasure to the officers of the Society to provide for the personal comforts of the Exhibitors as far as it is in their power to do so.

SPECIAL PROVISION FOR DELICATE WORKS.

(12.) The only subject which appears to require special consideration, as transcending the bounds of the Society's actual experience, is the best mode of providing for the display of artistic and other delicate works.

Two special circumstances affect this department:—

1st. The security for perfect dryness and good light must be more absolute for this department than for ordinary manufactures.

2ndly. Works of art in the sense here referred to are to be expected chiefly from exhibitors whose capital is their eye, their hand, and their genius. The expense incurred for frames, for packing, and for carriage, if thrown upon the exhibitors, would be a heavy set-off against any advantage to be derived from exhibition. A broad distinction may be drawn between the case of artists exhibiting the work of their own hands, and the case of dealers exhibiting the works of others purchased with a view to sale and profit.

The propriety of inviting amateurs to lend their works, or of admitting them if offered, and on what conditions, involves other questions to be separately considered.

(13.) Special arrangements must be made to meet these circumstances; and after careful inquiry, I have reason to believe that they can be made.

The building for the Artistic Department must be in the show-yard. To hire a building in the town would be to deprive both the exhibitor and the public of nearly all the benefit which is anticipated from putting objects of beauty before the thousands of persons attracted to the showyard by the animals, the poultry, and the music.

The building should be wider than 20 feet, and should be well lighted from above through glass.

I think it probable that, in order to overcome the reluctance which artists would naturally feel to incur expense for such an exhibition, the Society may be able to make arrangements for receiving portfolios of mounted drawings, and to place them under glass by a very simple method at a small charge to the exhibitor or to the purchaser.

I only mention these details to show that matters of this kind have not escaped notice, and will be attended to.

(14.) The practical conclusion as to the terms which can be offered to exhibitors by the Society is—

That exhibitors of manufactured goods may select for themselves from the four following kinds of accommodation :—

- | | | |
|--|---|---|
| 1. Uncovered space | { | 6d. per sq. yard, or about
5s. 6d. per 100 sq. feet. |
| 2. Space covered with canvas,
20 feet wide, sides open | { | 2s. per foot run,
or 10s. per 100 sq. feet. |
| 3. Space covered with canvas,
20 feet wide, sides boarded | { | 3s. 6d. per foot run, or
17s. 6d. per 100 sq. feet. |
| 4. Space in a wider building,
lighted with glass at top | { | Price not yet fixed. |

For hanging artists' pictures, the work of the exhibitors, and the space might be assigned by the Committee. The usual custom at exhibitions is to give the required space gratis, subject to a certain percentage on sales effected in the Exhibition.

COMMITTEE OF MANAGEMENT.

(15.) We may now pass on to the important question of whom shall the execution of arrangements be intrusted, and how to ensure the confidence of exhibitors?

Exhibitors of delicate works will require the security of a Committee of persons specially qualified by experience for dealing with such matters. To a well-constituted Sub-Committee the Council will probably not be unwilling to delegate sufficient power, subject to certain limits as to expenditure.

Such Sub-Committee need not consist exclusively of Members of the Council. A special subscription to the new experimental membership of the Bath and West of England Society, or a professional time freely given, might be accepted as a sufficient pledge of interest in the success of the new undertaking.

It is possible that a Guarantee Fund may be required to guard against the risk of too great expense; but this, I think, can be dispensed with, if full powers of admission or rejection

delegated to the Sub-Committee, and if the limits of the experiment are well defined.*

(16.) Exeter presents great advantages as the place of meeting for such a Committee; its position is central with reference to Plymouth and Barnstaple, as well as to all that lies eastward; but, what is more important, several persons reside at or near Exeter who have taken an active part in promoting the progress of the Arts, as testified by the flourishing condition of the School of Art and the Graphic Society.

I am enabled to state that gentlemen specially qualified by experience in Exhibitions, and publicly known to take an interest in the Arts, are prepared to give their assistance gratuitously to the Society, on the basis of the suggestions contained in this Memorandum.

T. D. ACLAND, Jun.

Sprydoncote, Exeter, Jan. 7, 1859.

Copy of the Letter referred to in page xxxiii.

DEAR SIR,—I am desirous to repeat, for the information of the members of the Society of Arts generally, the statement which I made from the chair on Wednesday the 8th instant, to those who remained in the room after the interesting discussion on Mr. Halkett's paper, namely, that a large Agricultural Society (the Bath and West of England) is about to extend its Exhibitions so as to include arts and manufactures, as well as objects of agricultural interest.

The Exhibition for 1858 took place at Cardiff, on special invitation from that town, which contributed 800*l.* towards the expenses, besides 1500*l.* paid at the gates in three days. The Exhibition for 1859 will take place at Barnstaple, in the heart of North Devon, in which district a local subscription of 1500*l.* has been raised to secure a visit from the Society.

In compliance with the wishes of the Exhibitors of agricultural implements, competition for prizes in that department is to be discontinued. The meeting will take the form of a Great Western Bazaar for exhibition and sale. The regulations for such an arrangement have been submitted to a large number of the Implement Exhibitors assembled at the Smithfield Show, and they have promised to support the Barnstaple meeting by sending their best goods. The prizes for cattle and poultry remain as usual.

The Society possesses a plant of waterproof shedding (on a plan invented by Mr. Jonathan Gray, and adopted for hospital tents in the Crimea) capable of covering 40,000 square feet (2000 feet run

* A very important suggestion has been made by a gentleman who is prepared to exert himself in carrying it out; namely, that an "Art-Union fund" should be raised, to be dispensed in prizes, the amount of the prizes to be expended on works of art sent to the Exhibition.

of 20 feet wide), for which the Implement Exhibitors pay cheerfully 2s. per foot run (20 square feet).

Arrangements will be made for more complete protection of articles exhibited, provided that Exhibitors are willing to contribute to the expense in proportion to their several requirements. The Society does not desire to make any profit by the shedding.

The object of the extended Exhibition is, to engraft on the rapid improvement in agricultural produce and machinery a corresponding improvement in taste, and, thereby, to extend the local demand for works of art and manufactures, whether useful or ornamental, of the highest quality and the best design. The want of a better market is acknowledged in all the Schools of Design. The Art-Union has already taken one step—we hope to take another.

The retail shopkeeper is often unable—sometimes even unwilling—to step in advance of the taste of his own district. In order therefore, to try our experiment with any hope of success, we must invoke the favourable consideration of enterprising and intelligent men at a distance. Is it too much to hope that some members of the Society of Arts will be disposed to enter, as a memorandum for the end of May, 1859, “Westward, Ho!”?

The show will be open from Monday, 29th May, to Friday, 3rd June, both inclusive. The Secretary is H. St. John Maule, Esq., 2, Wood-street, Bath, from whom further particulars may be obtained. I shall also be happy to give any explanation which may be required, as far as my time permits.—I am, &c.,

THOMAS DYKE ACLAND, JUN.

*To the Editor of the Journal of
the Society of Arts.*

ARTS AND MANUFACTURES EXHIBITION IN THE WEST OF ENGLAND.

SECOND LETTER TO THE SOCIETY OF ARTS.

Sprydoncote, Exeter, March 28, 1859.

DEAR SIR,—The facts that H. R. H. the Prince Consort has become a member of the “Bath and West of England Society for the Encouragement of Agriculture, Arts, Manufactures, and Commerce, founded 1777, A.D.,” and that the Committee of Council on Education have made a special exception in favour of the Society, in order to allow the selection of decorative works of art from South Kensington Museum to be exhibited at the North Devon Meeting at Barnstaple, may justify me in asking you to allow me again to invite the attention of the members of the Society of Arts to the objects of that meeting.

The Council of the Society, building on the steady progress of their agricultural gatherings, on the increased business done in the sale of agricultural implements, on the improved demand for education and scientific instruction, which has arisen in the West of England, and on the complete organisation and harmonious action of the Society, have opened a new department of “Arts and Manufactures” for exhibition and sale. A special fund has been raised for a moveable building, to be used next year at Dorchester; an admirable plan has been furnished by Mr. Nicholson, agricultural engineer, of Newark; and the support of the principal local dealers and manufacturers has been obtained.

The idea of the Exhibition, confessedly a novel one, gains ground in public estimation. It is recognised as not only good, but practicable. The idea is this,—that the summer gatherings of thousands of persons attracted by the sight of live animals, steam-ploughs, poultry, and music, may be made to minister to improvement in taste, if good and beautiful objects are placed before the visitors.

The migratory meetings of the British Association for the advancement of science, of the Royal Agricultural Society, the local examinations of the Universities and of the Society of Arts, have all tended to show that the civilizing action of railways must, in order to produce full results, be centrifugal as well

as centripetal; and that a pleasant holiday in the country is appreciated by many hard-working townsmen, who are not directly interested in the business of the meeting.

All that is wanted is a little energy, a little common sense, and a pervading spirit of harmony and goodwill among the managers of the first experiment. If the plan is a good one, and well worked out on a moderate scale, it is sure to be supported, and will be followed elsewhere.

Encouraging replies and promises of articles for exhibition and sale have been received from the Metropolis, from the Midlands, and from the North of England. The arrangements for protection and the charges for space appear to give satisfaction, being met on the part of exhibitors by a candid and liberal appreciation of the facts of the case.

Pottery, glass, metal-work, and wood-work, in their most attractive forms, will be well represented. The same may be said, so far as patterns are concerned, of textile fabrics; but the scale of the Exhibition hardly admits of the exhibition of pieces of cloth or prints, nor is there perhaps the same need for special efforts in these departments.

There will be an exquisite exhibition of water-colour drawings and sketches; the artists of the West of England need not fear comparison with all England. But in addition to the works of living artists, collections of the most precious kind, including works of Turner and other eminent artists, such as few have an opportunity of seeing, will be opened to the public in a manner which reflects the highest credit on their possessors.

The Exhibition will open on the 30th May, and last for the week. Alas! it is the week of the Derby, but we have entered and now we must run.

The entries close on the 16th April. Forms of entry may be had on application to Mr. George Down, Honorary Secretary, Cathedral-yard, Exeter.

I am, &c.,

THOMAS DYKE ACLAND, Jun.,
Chairman of the Arts and Manufactures Committee.

To P. Le Neve Foster, Esq.,
Secretary of the Society of Arts, Adelphi.

REPORTS AND PAPERS.

I.—*Reports on the Exhibition of Implements at Cardiff.*

NOTICE.

THE best thanks are due to the Judges of Implements at Cardiff for the promptitude with which they severally furnished their Reports. The separate publication of these Reports in December last afforded an opportunity for making an announcement of a conclusion to which the Council had arrived after the most careful inquiry and consideration.

At an unusually large meeting of the Council, on the 29th October last, attended by more than thirty members, it has been resolved, *nemine contradicente*:—That it is expedient to discontinue the system of prizes as hitherto conducted.

In lieu thereof every facility will be afforded on reasonable terms to exhibitors, to enable them to display their implements in actual operation, whether in the field or in the yard. It is also hoped that arrangements may be adopted for calling attention to any new or remarkable invention.

But the time has manifestly arrived for some change. The system of competitive trials has broken down under its own weight, but not before its original purpose has been fully answered. The talent of the first manufacturers in the world has been stimulated to the utmost pitch of exertion; and the result has been the creation of a far more potent stimulus than any prizes—namely, a world-wide market. The demand of this market is not to be met by a few prize machines got up for a special trial, but by a large number of well-made practical machines. As a necessary consequence the larger firms are no longer willing to withdraw from their legitimate business the time and attention required for frequently-recurring trials, and they decline as a body to enter into annual competition for prizes. On the other hand, the local trials of the Bath and West of England Society, conducted in seven successive years, have effectually quickened the intelligence of the West of England artizans, and have roused the attention of the smallest farmer to the importance of saving time, labour, and money, by means of a good implement; but it could answer no good end to con-

tinue the system of local prizes, if their only effect should be to stamp with spurious notoriety either second-rate implements of home invention, or inferior imitations of implements of acknowledged repute. The practical farmer has now ample access to information as to what is and what is not a labour-saving machine, and can either judge for himself or learn from the experience of his neighbours whether it will be more economical to have what he wants made at home, or to buy through the local agents from the larger makers at a distance.

For the Society it remains to do its best to give to manufacturers, agents, and purchasers an annual opportunity of meeting at a Great Western Bazaar.

It is the confident hope of the Council that implements of a more thoroughly practical character, and in larger numbers than heretofore, will be exhibited under circumstances most favourable to the convenience both of buyers and sellers. The interest of the Show, instead of being crowded into one or two days, may be spread over a longer time, so that more opportunity will be given for the transaction of business.

It may here be added, that an experiment was tried this year as to the extension of the exhibition in the direction of Arts and Manufactures.* A few prizes were offered at Cardiff for some of the articles of Welsh manufacture, and the result was encouraging to the extent to be expected when the short notice given, and the novelty of the occasion, are taken into account. It has been proposed to repeat the experiment in some analogous form at Barnstaple. Several articles of local and general interest, such as pottery, marbles, metal work, lace, and other works of ornamental art, may be exhibited under canvas. A growing tendency has been observed of late years towards making the annual meeting of the Society an occasion for introducing articles of use or ornament to public notice; a fact which need not excite surprise, when it is considered that a concourse of some twenty thousand persons, brought together for the purpose of seeing what is new or interesting, affords the best and cheapest advertisement for those who have the produce of their industry or intelligence to bring into notice.

It may be observed further that the ordinary business of a district depends on the retail tradesman and the commercial traveller; both of whom take as their standard the existing taste of a district.

The introduction of what is beautiful or new is a very slow

* Rule I. thus defines the first object of the Society:—"To hold meetings in the West of England for the exhibition of Breeding Stock, Agricultural Implements, and such other articles connected with Agriculture, Arts, Manufactures, and Commerce, as may be determined on by the Council."

process; and those who take an interest in extending the popular taste for good designs are aware that the ordinary course of retail trade opposes considerable resistance to progress in this direction, although there may be found among West of England tradesmen some notable exceptions to this remark.

The influence of exhibitions in promoting trade of the best kind is well known, and has been recently referred to in the Inaugural Address of the Chairman of the Council of the Society of Arts, in announcing the steps now being taken to prepare for a great international exhibition in 1861. The extended operations of our own Society date from 1851, and we may be foremost perhaps in the endeavour to do in the case of Arts, Manufactures, and Commerce what we have done in the case of Agriculture—namely, to keep alive in our own district an annual interest in the operations of Societies acting over a larger area, or at more distant intervals.

This Report cannot be allowed to go to press without an acknowledgment of the service rendered by Mr. Pitman in collecting, through a very extensive correspondence, the data from which the Implement Committee and the Council have drawn their conclusions on the working of the prize system so far as regards agricultural implements.

The further extension of the exhibitions of the Society, in accordance with its original constitution, is, by a vote of the Council on the 27th November, brought under the serious consideration of that body. Some time will be required to ascertain the views taken of the proposed plans by those who have works of art and industry to bring before the public. The best pledge for a good and practical result is the fact that the subject is in the hands of those to whose personal exertions the Society is already indebted for the success of its former exhibitions.

T. D. ACLAND.

REPORT OF THE JUDGES OF IMPLEMENTS IN THE FIELD.

To J. E. KNOLLYS, Esq., *Steward of Implements in the Field.*

DEAR SIR,—We, the Field-Judges, have great pleasure in complying with your request to be furnished with “some of our notes or reports of the trial of implements in our department.” We present this our report the more cheerfully, because it has seldom fallen to our lot to attend a meeting (and we have attended many) where the general arrangements were so good, or carried out with such readiness and promptitude; nor would we omit to notice the kind attention and ample provision made for our own personal comfort in every respect.

Our duties commenced with the trial of the cultivators, grubbers, and

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scarifiers in CLASS 5. We had only three implements brought forward, i.e. Bentall's broadshare arranged as a cultivator or grubber, Carson's scarifier, and Coleman's scarifier. The field was in that undesirable state likely to prove the best possible test for these powerful implements, abounding in twitch of strong quality and mature growth: having been left unploughed throughout the spring, the ground had become firm and compact, so that it was no easy matter to tear the furrows asunder. We had them first tried with their usual broadshares on each, taking 6 in. depth, Bentall's taking 4 ft. 6 in., Carson's 5 ft. 2 in., and Coleman's 5 ft. in width respectively. The work was very severe. Bentall's worked smoothly with occasional clogging, but the work was not sufficiently broken up. Carson's tore the twitch and sods up better, but it choked considerably. Coleman's performed its task in the best style, and left it in the best condition for subsequent harrowing. In this trial we looked to have the surface all cleared and thrown abroad; but as it is seldom necessary so to employ broadshares, we had the points substituted. In this position Bentall had 5 points, Carson 7 points, $3\frac{1}{2}$ in. each, Coleman 7 points, 4 in. each. The result of the trial in this state, and on this precise field, was the same in substance as the first. We tried the dynamometer at a corresponding depth for each of about 6 in., Bentall's taking 4 ft. 6 in. at a draught of 4 cwt. 1 qr. 14 lbs. barely; Carson's taking 4 ft. 6 in. at a draught of 4 cwt. 1 qr. 14 lbs. full; and Coleman's taking 4 ft. 4 in. at a draught of 4 cwt. $1\frac{1}{2}$ lb. barely. On the subtrial as parers, Bentall we thought manifested some superiority; but taking into consideration the work selected by the Society for us to try the relative powers of these implements upon, and the manner in which the work was done and the land prepared for the further harrowings and other workings, we could not do otherwise than come to the conclusion that Coleman's scarifier had the preference, and therefore awarded to it the prize. To Bentall's cultivator, in consideration of its power and the excellency of its paring and scarifying with points, we awarded a high commendation; and to Carson's scarifier we awarded a commendation as a highly useful implement of great capacity and varied power. We ought to name a useful grubber brought for trial in this Class by Mr. Comins, but the work was unsuited to its particular arrangement of teeth, and it did not do well.

CLASS 6.—The trial of *Harrow-Grubbers, Scarifiers, or Cultivators* followed but the exceedingly rough work they had to accomplish did not show them off to any advantage; neither of them was well qualified to perform it. Bentall's, with its three tines taking 3 ft. 3 in., did as well as we could expect, but of no real service in such work. The draught at 5 in., 1 cwt. 1 qr. 10 lbs. barely. For its simplicity and general utility we awarded it a commendation. Carson's was also a modification of his larger implement; it took 3 ft. 5 in. with three tines, and, having four wheels, we thought it did more imperfectly, but the work was foul. The draught at 5 in. of 1 cwt. 2 qrs. Coleman's took 3 ft. 10 in., and certainly made the best work, but even that not good; evidencing to us that these little implements are of no value in such rough work. It worked with five tines, and the draught at 5 in. was 1 cwt. 1 qr. 15 lbs., consequently for lightness of draught and the best work we awarded it the prize.

Our next CLASS, 7, was that of *Single or Double Drags*.—In this class we were in some perplexity as to the term drag, none of the implements coming up to the generally received notion of a drag—in fact, they were all large twin harrows of Howard's pattern, i.e. drag-harrows, 3-horse harrows. We could not have desired a better test of merit than these rough fallows presented—the difficulty being to work at all. Mr. Lyne's were the only harrows that could not be made to choke. They are a new invention and of a novel construction, consisting of seven serpentine bars attached at the front end by

a rod running through loops on the bars and kept apart by ferrules, and at the hinder end by jointed bars which permit them to rise or fall over their work at pleasure. The teeth are fairly arranged, and weights are unnecessarily appended behind. They worked exceedingly well, but on close observation, everything being new and in order, it was to be perceived that the teeth could not retain the perpendicular, but swerved in work; and if so when new, what must be expected when the loops and ferrules in front begin to wear? However, we thought the invention worthy of our especial notice, and awarded to the implement a certificate of merit. Bentall's large harrows received the prize. We shall only observe that they worked steadily, left the best surface, and gave tokens of great utility with cheapness. Eddy's harrows stood next in our favour; they worked exceedingly well, and received our first commendation. We, however, thought the tines did not track quite right, working too much in line. Wright's is a good useful set of low-priced harrows, worked very well, and received our second commendation. The teeth track indifferently, but the work was trying. Fry's is a good set of strong-made harrows, with a peculiar whipple-tree; they worked well; price rather high. Coleman worked his heavy expanding harrows: however valuable for stetch-work, they did not show well here. Comins has made an addition behind of a slightly bent row of teeth, which improved his work.

CLASS 8—Harrows for General Purposes—was almost a repetition of the drag-harrow trials, the same parties being competitors with modifications of the same implements. Bentall's consists of four harrows, 15 tines each, taking 8 ft. Fry's, three harrows of 24 tines each, taking 9 ft. 6 in.; the tines well squared into the bottom bar and screwed down at top; they worked truly well, and very properly received the awarded prize. Eddy, three harrows of 24 tines each, taking 9 ft.; these were rather light for the class, and the fastenings common. Comins, three harrows, 20 tines each, taking 8 ft. 6 in.; flat bars, his hinder tines a little bent. Lyne tried two sets; the same make as the large set: at either end of the serpentine or letter S-shaped bar are straight ends, the front for the loop, the hinder for the jointed bars. The set we most approved, and to which we awarded a special prize of 3 sovereigns for its originality and usefulness, was the one with strengthening braces; it contains 13 bars of 5 tines each, squared in and screwed fast by one nut, with a straight bar on each increasing its stability. Our object in awarding this special prize and other favourable notice was more for the purpose of encouraging original and useful inventions than to stamp our approval upon this as a first-class implement. We think well of it, but we have great doubts of its wearing parts, particularly the loops and ferrules retaining their position, in which case it cannot work well, as the teeth cannot be kept upright, but must swerve in work. Coleman's expanding stetch-harrows worked well. The tines are tapped into the bar and screwed fast. We have never had these sets fairly tried on stetches, and on level work it is difficult to drive the horses right so as to keep them at the required extension. Wright's are three harrows of 20 tines each, taking near 10 ft., and are rather more than serpentine, having an additional turn at either end of the bar. The teeth are adjusted for coarse or fine work, and are cheap.

CLASS 9.—This is for a set of *Seed-Harrows*, and we had previously the same competitors. Bentall's are the same pattern, and in weight and size are well calculated for light seed-harrows. They worked very nicely, and received our commendation. Fry's we thought altogether too light for general or even light seed-harrows. Comins produced a very serviceable set of three harrows of 20 tines each, taking 9 ft. They were strongly made, and worked exceedingly well. We had much pleasure in awarding to them a high commendation. Lyne's were a modification of his other harrows, which we have fully noticed. Wright's are a set of three harrows of 24 tines each, taking

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8 ft.; the tines are $6\frac{1}{2}$ in. long, and are screwed through both bars. They were altogether a stronger and more serviceable set than any tried, and well: the price is also very low. On these good considerations we awarded to this set the prize.

CLASS 10. Chain Harrows.—As this class of harrows or pulverisers is day becoming more popular, we endeavoured to arrive at a correct decision and more especially as, although we had but two implements in competition they were upon somewhat different principles and differing also in details. The old harrow of Cartwright's invention, shown by Cambridge, is made of square iron rods in square links of about 4 in. sides; the expanding apparatus being also a series of oval links stretching across with two points to facilitate the working. The harrow shown by Lemon differs mainly in having a point at each corner of this square link about 2 in. long; the expanding apparatus not differing materially. If these points did not interfere with the free proper working of the implement, they must aid in pulverisation and durability; this was the question for us to try. The twitch was green soil damp on the first trial, so we agreed to a second when the twitch should be withered. We gave them every attention, both were tried fairly, and a further proof we had the horses trotted in work, but in every case we arrived at the same result—i. e. that, although they both worked admirably, Cambridge had the advantage both in pulverisation and in shaking out the soil from the twitch; consequently we awarded to it the prize, but gave a certificate of merit to Lemon's.

CLASS 11 is the class of Clodcrushers or Pulverisers. In this class we had six in competition, i. e. Gliddon's, Fry's, Carson's, Cambridge's, Eddy's, and Bird's. Gliddon's is small; there is an alteration in the discs to fit it to a press-wheel roller; it worked satisfactorily. Fry exhibited Paterson's known nibbed disc crusher. It fully sustained its well-earned reputation and received our first commendation. Carson's is a large crusher, 6 ft. 6 in. diameter, 24 in. discs, and is a rather singular but highly useful combination of Paterson and Cambridge discs. The rim of Paterson's nibbed discs is large enough to fit or revolve over the smaller discs of the Cambridge pattern and by which solely they are kept in place and in work, the smaller discs carrying the larger rims round with them. It certainly worked well on and appeared to us an improvement. We gave it our second commendation. We subsequently attached to it the dynamometer, which also gave a satisfactory result. To Cambridge's crusher we awarded the prize, not on its general usefulness as a field-roller and crusher, but for the introduction of an important improvement which can be dispensed with at pleasure. It consisted of a narrow serrated wheel or disc being placed between each plain wheel, which the crushing is greatly facilitated. It also proved well when tested on the dynamometer. Eddy's is a good crusher, though short, and we gave it our third commendation for a cleverly-adapted scraper to the serrated wheel. Bird exhibited Crosskill's old crusher with alternate discs differing in diameter. The price (£20l.) prevented a commendation, but, of course, it worked as well as ever. The dynamometer being attached to several crushers we observed to the draught to be contrary to our expectations, those crushers possessing discs differing in diameter having a slight advantage.

The trial of *General Purpose Ploughs*, or CLASS 2, came next before us. We had eight ploughs brought into competition, which were exhibited by M. Fry, Carson, Eddy, Comins, Lemon, Wright, Hole, and Lewis respectively. We took every pains to insure a full and satisfactory trial, and upon principles which have heretofore guided us in former decisions, and which the public have set their approval, i. e. to give the prize to that plough which running truest upon its own furrow-sole shall make the best

ective of the ploughman) with the least draught. The construction of ough to be taken into account. The field being properly set out, and re strangers to it, we arranged to place the plough as entered in our consequently Fry took place No. 1, and so in succession. As usual, five bouts were permitted to bring the work to the required depth and i. e. 6 in. by 9 in., and alternately 7 in. by 10 in. The work to be done severe, and not much actual good ploughing was effected, and scarcely uld work level on its own furrow-sole, in consequence of every effort requisite to keep in work. Fry brought forward a plough invented by Coeens, having a 4 ft. 9 in. mould-turner, with a friction wheel to run furrow-sole, which, however, it scarcely ever touched, owing to the ty to keep it too much on its points from the state of the soil: the mould- pressed the furrow wide and heavily, laying it too flat. Carson took with a plough of good form and construction, invented by himself; the -turner rather short, i. e. 3 ft. 4 in. The work was fairly laid, but ose, and with great difficulty an even furrow-sole was occasionally

The dynamometer giving a moderate draught to this plough, we d to it a commendation. Eddy took No. 3; his plough possesses excellent points, and appeared to be of the most approved pattern; it ly on close inspection of its details, and in its working, that we could imperfections; this was proved in work; its chief fault being in throw- e furrow too wide and breaking it up in the deep-ploughing. The t not being heavy, we awarded it a commendation. Comins took No. 4, useful country plough of his own invention, but of no great merit. The t will be seen below. Lemon took No. 5, with Ball's plough, in the of a good ploughman. The mould-turner, 4 ft. 6 in., we thought too the plough ran well on its furrow-sole, made good work, except in g the furrow too much aside, and heavily on the top edge, as we anti- l. The draught proved light. We gave it a high commendation. J.

Wright took No. 6, with their highly useful plough invented by them- This appeared to us to be in the truest form and under the best adjust- for insuring a uniform lift without undue friction. The mould-turner, 0 in., had the popular incline, which it proved correct. The work was one, the furrow clean cut, and laid at the proper angle; the plough g evenly on its furrow-sole. The draught proved light. We thought led to, and gave it, the prize. Hole took No. 7, with a plough his own on, having a convex mould-turner. We could not commend the work articularly in deep-ploughing. Draught not, however, heavy. Lewis o. 8, with a plough also his own invention. The work was well done, th a slightly improved inclination of the mould-turner, particularly in t lift, it will become a first-class plough. We commended it as a good r plough. We append the relative draughts (by dynamometer) of the s in the different work in which they were tested. Depth and width y 9 in. :—

—				Tellings.	Greatest Cut.	Least Cut.	Average.
							cwt. qrs. lbs.
Coeens's	..	..	..	19	4	3½	3 2 17
own invention	..	..	..	21	4	3½	3 2 21
ditto	(scant depth)	..	..	18	3½	3	3 1 17
ditto	..	..	..	22	3½	3	3 1 19
Ball's	..	..	..	22	4	3	3 1 5
own invention	..	..	..	24	4½	3½	3 2 17
ditto	(rather scant depth)	..	..	22	3½	2½	3 0 20
ditto	(second trial)	..	..	19	4	3½	3 2 8

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The following were selected for deep ploughing at 7 in. by 10 in., and draught (by dynamometer) taken upon the sixth or seventh bout :—

—	Tellings.	Greatest Cut.	Least Cut.	Aver
Lemon	15	4½	4	4 0
Wright	16	4½	3½	4 0
Carson	18	5	4	4 2
Eddy	19	4½	4	4 1
Lewis	15	4½	4	4 1
Mr. Comins having applied to us to allow the draught of his plough to be taken at this depth, the result arrived at was this	20	6	4½	5 1

CLASS 3. *Subsoil Ploughs* were next tried. Bentall again brought ward his scarifier beam with proper subsoil share, and coulter attached made as usual good work, with great steadiness of draught. He once very deservedly received the prize. Eddy's subsoiler worked well, but pulverising prongs proved obstructive; these were removed, when i admirably. We awarded it a commendation. Comins brought forward well-known subsoiler, having three prongs, one of which broke in v J. and R. Wright worked with considerable difficulty an effective imple of good promise.

CLASS 4. *Turnwrest Ploughs*.—In this class only Eddy and M Wright competed. The construction of these ploughs merits a word or but our limits do not permit it. Eddy's is more compactly adapted to its pose, and the parts fit to a nicety on turning, so that the mould-turner is adjusted for making good work. We awarded it the prize. Wright's well-arranged plough, and made good work, and we were pleased to awa a commendation. The respective draughts of the ploughs, turning the fi against the hill—Eddy's 3½ cwt., Wright's a little less.

CLASS 12. We now pass on to the *Corn Drills*. These were not tried the only one we found entered as qualified for a general purpose drill Smith's well-known Peasenhall Drill, to which we, without hesitation, aw the prize.

CLASS 13. *Drills for Small Occupations*.—We found none enter worthy of the prize, we therefore withheld it.

CLASS 14. *Turnip or Mangold Wurzel Drills for Ridge or Flat, pable of depositing manure with the seed.*—Messrs. Reeves made the entry, but we needed no more; it is admirably effective for every pur especially for drilling small quantities of concentrated manures. It is a and very useful machine, and we had great pleasure in awarding to i prize of 5*l*.

CLASS 15. This class is intended for *General Drills* "capable of distrib at pleasure liquid manure with the seed." We had two entries, but the not, nor did we see, nor have we any particular desire to see, any imple that would fully answer the conditions on which this curious prize was of and by the direction of the Steward it was withheld; but we awarded t Messrs. Reeves a special prize of 5*l*. for their Chandler's water-drill, with R improvements and Chambers' drop, in which department it works admira

185 16. *General Manure Distributors.*—The only competitors were May and Reeves. Brown and May's distributor possesses great facilities when preceded by a manure cart, and which it is designed to, so as to distribute the manure as supplied out of the cart. It has a apparatus, which, revolving, will spread long manure very readily. We thought it more novel than useful. Reeves' distributor did admirably, dealing with great regularity from two bushels to any indefinite quantity of manure of varied roughness. We had great pleasure in awarding it the

185 17 being a second prize was withheld.

185 18. *Horse-Hoes for Green Crops on the Ridge or Flat.*—We had a competition in excellent variety, Messrs. Fry, Carson, Comins, Wright, Bentall, and Lewis being competitors. In all these cases we have much to consider: a light coultered horse-hoe will work well in loamy or sandy soil, but on stony land we require a more powerful cutter; hence we approved Comins' horse-hoe; the shares or cutters are strong, and properly shaped for heavy soils, whilst on light loams they must partially clog, and the prongs of the hinder shares tend to aid such clogging; still the arrangement of the front share stalks through the beam stand quite first, as no standing crop receives injury in working. It worked admirably, and showed but little signs of clogging, the land being clean and stony. We gave to it the

Comins showed a good hoe of 8 tines or grubbers, or 3 shares; his front cutters were in good form. Hole's is a moveable expanding frame, with 2 points, 2 shares, a very useful implement on most soils. Wright's has an oval frame extending out so as to endanger a standing crop; he has a shaped share, 1 chisel point, and 2 curved cutters of very superior form. Bentall has his long beam and cross bar as usual, with 1 share and 3 cutters hanging over, so that 2 rows, or rather 1 row and 2 halves, may be hoed over; it works well, and does much at one operation. We commended its many useful adaptations, according to our class, but not as a simple horse-hoe. Lewis has 4 cutters, with regulating wheel behind; his long cross bar is fatal to ridge work or standing crops, and the wheels at the end of the beam are detrimental. Fry has one V-shaped share and 2 cutters, half shares, and a small

185 19. *The same adapted for Steep Hill-sides.*—Messrs. Fry, Carson, and Bentall were the competitors here, and with precisely the same kind of implements, but each making an alteration at the hake, diverting the line of draught rods, with the view of keeping the hoe running parallel with the row and of tending downwards. Mr. Carson's clever improvement also alters the position of the implement; and considering this combination a step in the direction of securing a good horse-hoe for "hill sides," we, with the sanction of the engineer, awarded Mr. Carson the prize.

185 20. *Turnip Thinners on the Ridge or Flat.*—Mr. Eaton showed two useful thinners, which not only set out at the respective distances of 9 and 2 in., but effectively hoed the land between the rows at the same time. We referred the thinner taking two rows together, and awarded it the prize.

185 21. *Filling up Vacancies.*—Mr. Holmes had a very useful little implement for this purpose, but it was not entered for competition.

185 22. *Haymaking Machines.*—Only one entry, Messrs. Smith and May. It was not tried; but from our full and most satisfactory knowledge of its merits, we had much pleasure in again awarding it the prize.

We gave a special prize to Woofe's *Paring Plough*, a light and effective implement for such purpose. The revolving knife and vibrating or pushing share-blade prepare a sod of convenient size for drying and burning with great readiness and facility. A useful horse would work it well.

Reaping-Machines.—Messrs. Burgess and Key, and R. Mathers, were the only competitors; but as the rye was green and unfit for harvesting, and the trial by no means likely to afford a true test of merit, we paid but little attention to it, and therefore decline to report upon it. We examined them especially in the Show-yard; and judging from the general plan and mechanical workmanship and details, the excellent reaper of Burgess and Key was not in danger of being superseded by that of Mather, and the report of those who attended more especially to these trials was, that it did admirably.

(Signed)

JNO. CLARKE.
CLARE SEWELL READ.

STEAM-POWER APPLIED TO THE CULTIVATION OF THE LAND.

In this very interesting department of the Society's operations we had a good competition, Messrs. Fowler, Smith, Cambridge, and Coleman having their powerful implements in the field. Mr. Fowler's one-way or turnwrest ploughs, four bodies of which being appended to each end of his rather ponderous balance frame, made capital work at great depth. They were worked by his new improved and economical windlass, by which he saves about one-third in length of his strong and expensive wire rope, and the cost of the workman to see to the proper coiling. This admirable windlass has two large drums of 4 ft. diameter, around which the rope is so wound in grooves, that as it is winding up on to the one drum it is paying off on the other, and that without difficulty or slipping; other improvements were pointed out to us, but this is the main one since we last witnessed it in work. The work was as well done and as well laid with as even furrow-sole and in as good state for the harrows as need to be, and the work proceeded very satisfactorily and expeditiously, so as to merit our entire approval. The engine and windlass, as usual constituting one machine, was conveniently placed at one end of the work, and Worby's patent anchorage at the opposite end, each moving along the headland by attached apparatus for that purpose as the ploughing proceeds; thus requiring merely the presence of two men to work it, and one boy to move the friction barrows. Smith's complete set of implements for accomplishing every reasonable purpose of steam cultivation was also brought under our notice. The windlass and anchorages are not equal to Fowler's in some respects. The saving of rope is important, and these anchorages are moveable only by manual labour as the work proceeds, requiring two attendants for that purpose, and also a workman to see to the proper coiling of the rope on the windlass. The anchorages are provided with wheels or reels, around which the wire rope is drawn, and his implements are admirably turned at the end by means of his celebrated turn-bow, which is simply an elongated plough-hake with projecting points inside to catch the rope-loop. The work done by Smith's machinery is cultivating or grubbing, not ploughing. His trenching plough made admirable work, which, if requisite, would really be a substitute for the plough or the spade, as it does invert the soil and covers up the surface herbage by making a large closed ridge, which is split at a subsequent operation. The cultivating department was admirably done, and in such a way and at such a depth as but few teams of horses could so steadily and evenly accomplish, if they could be found to do it at all, particularly at the pace travelled, i. e. about

3½ miles per hour. On crossing the work done by the first grubber with one of larger size, the work was left in such a thoroughly good state of rough fallowing as fully to satisfy us. Cambridge brought a locomotive engine, with *Boydell's* patent railway patters: to this were attached three of *Eddy's* ploughs by chains, each worked by a competent ploughman. The engine was admirably driven, and the ploughs would have made excellent work had not the company incommoded the ploughmen; when a fair course was obtained the work was well done. We cannot, however, give our full approval to this mode of applying steam-power to cultivation; we were satisfied from what we witnessed in this trial that the stationary or shifting engine plan is yet the best and readiest application of that vast power. *Coleman's* powerful eight-coultured steam cultivator was also tried, being drawn by this tremendous iron steam-horse. It stalked away with it without difficulty, and tore up the grassy seeds at great depth, and broke it up most admirably.

(Signed)

JNO. CLARKE.

REPORT OF THE JUDGES OF THRESHING-MACHINES, CHAFF-CUTTERS, AND PULSE-BRUISERS.

We do not consider it necessary to write a long report on the trials of implements which came under our notice, hoping the subjoined tables will be quite sufficient to justify our decisions and also to act as guides to farmers requiring such machines.

We spared no pains to discover their several good points, and by the number of those points we decided on their merits. That the competition in threshing-machines was not greater we much regret (especially when we saw so many machines sent by first-rate makers standing side by side with those that were tried, and shining with all the polish of well-finished workmanship), and sorry we were that we could not see them do the work which we were fully justified in expecting them to be capable of. We shall be glad, for the benefit of the farmer, if *Humphries's* machine is beaten at *Chester* by some machine making *cleaner work* and requiring no more power to work it. This remark has special reference to the shaking of the barley, which was most indifferently done by the machines of both *Humphries* and *Cambridge*. It also applies, but in a less degree, to the shaking of the wheat. This may, however, have been the result of rapid feeding, and may not be the case when threshing at an ordinary rate. It is only just towards the machines of the *Messrs. Humphries* to say that there was not the slightest tendency to choking in either their shakers or riddles, so that the evil would not be increased by continued working—a remark which does not apply to that of *Mr. Cambridge*. They also possess the great advantage of separating the seeds of weeds from the corn, chaff, and chavings. The chaff and chavings were also well divided, and the machines were exceedingly well made, very compact, and quickly set to work. We tested the dressed corn of *Humphries* and *Cambridge* by passing it through *Mr. Bobby's* excellent screen, and also made comparison with corn dressed by the prize hand-power dressing-machine by subjecting that to the same test, and found them equal in all respects. It was a great triumph for the finishing threshing-machines. We think great care and caution are necessary with regard to their use, and, when worked in the field, farmers and their men ought to be very attentive as to the mixture of the corn from the tops and bottoms of stacks with that threshed from the middle; added to which, good feeding of the machine and the regular speed of the steam-engine are most essential points to be attended to. We must still think the great weight of most of these machines is a serious objection.

Reports on the Exhibition of Implements at Cardiff.

PORTABLE COMBINED FINISHING THRESHING-MACHINES.

Wheat.

Work represented by . . .										10	10	10	10	10	50					
Nominal Horse-power.	Real Horse-power.	Time in Minutes Threshing 200 Sheaves of Wheat.	Horse-power consumed if Threshed in 1 Minute.	Clean Threshed.	Clean Shaken.	Chavings free from Corn.	Chaff free from Corn.	Corn Unbroken.	Comparative Merit.	Straw Unbroken.	State of Sample.	State of Shaker after Trial.	State of Riddles after Trial.	Award.						
5	5.657	13.94	78.85	10	8	9	10	8	45	un-broken	good	not clear	not clear	..						
6	6.914	11.97	82.76	10	8	10	9	10	47	un-broken	very good	quite clear	quite clear	prize	Hummeller broke the corn, ultimately choked, and trial ceased.					

Barley.

..	4.714	9.85	46.43	10	3	4	10	7	34	..	very good	2nd Rate	3rd Rate	prize
..	6.286	9.85	61.91	10	3	10	10	8	41	..	very good	1st Rate	1st Rate	prize

ext came the Threshing-machines not exceeding 8-horse power, which ld make the best subdivisions of corn and refuse; and here again, as the es will show, the Messrs. Humphries were the winners. For general use on most farms these are good and serviceable machines.

LE COMBINED STEAM THRESHING-MACHINES not requiring more than 8-hors power, which shall make the best subdivisions of Corn and Refuse.

Wheat.

Work represented by . . .										10	10	10	10	10	50					
Nominal Horse-power.	Real Horse-power.	Time in Minutes Threshing 200 Sheaves of Wheat.	Horse-power consumed if Threshed in 1 Minute.	Clean Threshed.	Clean Shaken.	Chavings free from Corn.	Chaff free from Corn.	Corn Unbroken.	Comparative Merit.	Straw Unbroken.	State of Sample.	State of Shaker after Trial.	State of Riddles after Trial.	Award.						
5	6.914	11.4	79.819	10	8	10	10	10	48	un-broken	..	clear	clear	prize	General bad work, and the workmanship of the machine most indifferent.					
34	..	18.40	and general bad work.																	
5	6.914	10.68	73.841	10	6	10	10	8	44	broken	..	not clear	not clear	..						

Barley.

..	5.343	10.68	57.063	10	8	10	10	8	46	..	..	1st Rate	1st Rate	prize
..	5.657	10.23	57.871	10	4	9	10	8	41	..	..	2nd Rate	2nd Rate	

THRESHING-MACHINES FOR HORSE-POWER.

These machines, which are introduced for the use of small occupiers, can scarcely be recommended as economical. They are so constructed that the spaces allotted for the corn, chaff, and chavings are each so limited and so awkwardly placed that they require constant attention to keep them clear. The labour required, therefore, in proportion to the work done, must be much greater than in the better description of machines. The shakers, too, except Beare's machine (in which they were greatly elevated and answered very well), are on too small a scale to be effective, and the corn passed away with the straw in a most wasteful manner. This may not, however, be so much the case when fed at a rate commensurate with the draught of 4 horses, by which they are intended to be worked. They were driven during their trial by steam-power and fed much too fast. However, Mr. Beare's machine did most work and was by far the best made, so we gave it the prize.

THE THRESHING-MACHINE with Riddle and Straw Shaker, not requiring more than 3½ Horse-Power when worked independent of its Horse-gear.

Wheat.

Feet Work represented by . . .				10	10	10	10	10	50								
	Nominal Horse-power.	Real Horse-power.	Time in Minutes Threshing 60 Sheaves of Wheat.	Horse-power consumed if threshed in 1 Minute.	Clean Threshed.	Clean Shaken.	Chavings free from Corn.	Chaff free from Corn.	Corn Unbroken.	Comparative Merit.	Straw Unbroken.	State of Sample.	State of Shaker after Trial.	State of Riddles after Trial.	Award.	Price.	
1.	3½	4.4	4.584	20.169	10	0	{ Shaking so bad that it was not considered worthy of further trial. }										40
2.	3½	5.028	4.772	23.993	10	10	8	10	9	47 { unbroken }	..	clear	clear	prize	..	32	
3.	3½	4.714	6.136	28.935	8	0	10	10	5	33 { rather broken }	..	clear	clear	..	..	48	

CHAFF-CUTTERS.

The Chaff-Cutters in general made good work, but none could cut the same quantity as Messrs. Carson and Cornes. The workmanship of their machines and the work done by them was most satisfactory, and difficult was the task (until the dynamometer's notes were examined) for the Judges to decide on their respective merits. It will be long before such machines can be surpassed. We gave the prize to Mr. Carson, highly commending Mr. Cornes, and commending those of Richmond and Chandler and Messrs. Smith and Ashby. Each machine was made to cut for three minutes, and the results were as follows :—

		Chaff.	Time.	Price.
		lbs.	Min.	£. s. d.
Carson .. .. .	.. .. .	104	3	13 13 0
Cornes .. .. .	.. .. .	97	3	13 0 0
Richmond and Chandler .. .. .	.. .. .	61	3	7 0 0
Smith and Ashby .. .. .	.. .. .	64½	3	10 10 0

Messrs. Carson's, Cornes's, and Smith and Ashby's machines had reverse as well as stopping motions. The other machines had no reverse motions.

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The Corn and Pulse-bruise of Messrs. Turner worked as well as ever; the machine tried was also fitted up for splitting beans, and the price was 15*l.* 12*s.*

	Barley.	Time.	Price.	
	<i>lbs.</i>	<i>Min.</i>	<i>£. s. d.</i>	
Turner (crushing)	56	6	12 0 0	
Richmond and Chandler	56	19	6 9 0	

Mr. Bentall was again successful with his machine for pulping roots; in fact, there was no competition.

For Portable Four-Horse Gear, adapted for driving threshing-machines, we gave the prize to Mr. Beare; and for Single-Horse Gear for driving chaff-cutters, &c., Messrs. Fry of Bristol were the successful exhibitors.

While thus drawing our report to a conclusion, we trust that more attention will for the future be paid to the altering of the wind-boards, and the slides for reducing or increasing the blast of the respective combined threshing-machines, which alteration ought not to necessitate the stopping of the machine. If we remember right, Messrs. Hornsby's machines are particularly well arranged in this respect.

A pleasant duty now devolves upon us, which is to tender our most sincere thanks to Mr. John Gray for his invaluable assistance in the Show-Yard, and to all others connected with the Bath and West of England Society for their unbounded kindness and attention.

(Signed)

H. B. CALDWELL.
OWEN WALLIS.

REPORT OF THE JUDGES ON THE MISCELLANEOUS CLASSES OF IMPLEMENTS.

CLASS 33. *The best Winnowing Machine, which shall be readily converted into a simple Blower.*—None of the machines for trial carried out this condition. The workmanship, with two or three exceptions, was very indifferent; one was quite discreditable to maker and exhibitor. The prize was given to Messrs. Burrow and Page, and a commendation to Mr. Boby's combined dressing-machine and corn-screen. In this class we also gave an especial award to Mr. Boby for improvements in his corn-screen, by which the wires can be set fine or coarse: a riddle is also added by which the grain is divested of all rough substances, such as beans, short straws, &c.

CLASS 34. *The best One-Horse Cart for general purposes.*—GEORGE MILFORD, Thorverton, Devon. Stand 20, Art. 2. *A One-Horse Cart.*—Half the prize is awarded to this well-made cart, which deserves great praise; but the height of the wheels is a matter on which the judges will further on express an opinion. At present they merely observe that this is the chief defect in this cart.

T. MILFORD and Sons, Thorverton, Devon. Stand 37, Art. 2. *A One-Horse Cart.*—Half the prize is awarded to this cart, which is well made, and deserves its share of the prize. The height of the wheels is also the chief defect in this cart. In both these prize-carts the soles project too far, and thus interfere with tipping: these projections should be sawn off.

MUNRO and Co., Bristol. Stand 18, Art. 2. *Hannam's Harvest-Cart.*—The body of this cart is very good. There is a defect in the wheels, the bushes being far too short.

Art. 6. *A Two-Wheeled Family Coburg, with fulcrum Shafts and cranked Axle.*—This is a very useful carriage.

D, Cardiff. Stand 21, Art. 72. *A One-Horse Cart.*—The body is 10 above the axle: with the exception of this defect, the cart is well made & properly axled.

; Bristol. Stand 28, Art. 7. *Crank-Axle Cart.*—This is a very good for the conveyance of goods from railway stations; but the bearings of axles are too short.

and 69, Art. 1. *An Iron Cart.*—This cart is so objectionable in every way, that the judges consider it their duty to respectfully suggest that the owner should not use it. It is clumsily made, particularly the shafts, which, being horizontal, place on the horse's back no less a weight than 175 lbs. The shafts have no wood felloes, but only an iron rim: this, of course, would do no good on soft ground. The weight of the cart was understood to be over 12 cwt. The judges think that a few mechanical rules for the guidance of farm-cart makers may be acceptable. The wheels should be dishd for strength; the axle should be cylindrical, consequently the felloes should not be bevelled. The body of the cart should be placed down on the axle: by keeping the body down the cart is easier drawn and easier filled. There should be very little projection of the body behind the tailboard, as the projection only interferes with the tipping: the cart should be at liberty in every way, so as to allow it to tip freely. When the cart is in the shafts the body of the cart should be horizontal. The height of the wheels should rarely exceed 4 feet 6 inches. It is true that high wheels are draught; but it is likewise true that they are much less durable, more expensive, and heavier, and, for farming purposes, they are much in the way. Each undoubtedly carry heavy weights on roads in their carts with high and long bodies (the length of the body enables the carter to keep the cart off the gravity of his load low), and we admit that these carts answer admirably the purpose for which they are intended; but with respect to a farmer's cart which is sometimes filled and emptied fifty times in a day, other considerations besides draught must be taken into account—viz, handiness in load-throwing, strength, durability, and cheapness.

is 35. *For the best Two-Horse Waggon, provided with efficient means for giving it speed down hill, without dragging or locking the wheels.*—T. MILFORD and Sons, Thorverton, Devon. Stand 37, Art. 4. A cheap well-made waggon; but there is too much weight on the fore wheels. It is provided with a half prize was awarded to this waggon.

and 36. MILFORD, Thorverton, Devon. Stand 20, Art. 1. A cheap well-made waggon, to which half the prize was awarded. It so much resembles the one mentioned above, made by T. Milford and Sons, that the same remarks apply to both.

There were several other waggons exhibited; but they all, more or less, displayed mechanical defects. Some were wrong in the construction of the wheels; many, by way of ornament perhaps, had the body twisted in a most expensive & useless manner; in some the body was too narrow; in others the break was defective: in all the weight was not sufficiently thrown upon the hind or rear wheels. The judges recommend that the fore wheels of a waggon should carry much of its weight, but that the load should rest principally on the rear wheels, and that the low fore wheels, by bringing them forward as far as the front of the waggon will admit, should be used more as a steerage than for carrying half the load.

is 37. *The best Root-Pulper.*—Mr. Bentall's, of Heybridge, being the only one exhibited, we felt no diffidence in awarding him the prize.

is 38. *The best Turnip-Cutter.*—Messrs. Fry and Bird (Mr. Samuelson's) each exhibited one of his Gardner's cutters. The prize was shared between them for this standard implement.

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CLASS 40. *The best Oilcake-Crusher.*—Mr. Bentall's new crusher had the prize, which was very closely contested by Messrs. Smith and Ashby, to whom a high commendation for their simple breaker was given. The result of trial we subjoin :—

Name of Exhibitor.	Weight of American Cake.	Time in Crushing for Sheep.	Remarks.	Price.
	Stone.	Min. Sec.		£. s. d.
Bentall	2	1 18	Sample satisfactory	3 13 6
Smith and Ashby	2	1 47	Ditto	3 10 6

CLASS 41. *Gorse-Bruiser, or Chopper.*—Richmond and Chandler's chopper was the only one brought under our notice, and to them was the prize granted.

CLASS 42. *The best Steaming-Apparatus for preparing Food for Cattle, Pigs, &c.*—Richmond and Chandler again obtained the prize.

CLASS 43. *The best Churn.*—Two churns were put to the test with four quarts of cream each. The following was the result :—

Name of Exhibitor.	Time.	Weight of Butter.	Price.
	Min. Sec.	lbs. oz.	£. s. d.
Bird (Anthony's patent)	12 20	5 6	2 10 0
Powell	6 42	5 4	10 10 0

The butter produced by the first churn was superior in flavour and solidity; and the price of the latter, being exorbitant, fully justified us in giving Mr. Bird the prize.

CLASS 44. *The best Cheese-Press.*—Of the four which were shown, Mr. Carson's, of Warminster, was considered the best. A weight of 16 lbs. suspended to a compound lever, gives 576 lbs. pressure on the cheese.

CLASS 45. *The best Cooking-Apparatus for Farm-house Kitchens.*—Mr. Gliddon, of Taunton, had the best of this class, and a very neat and apparently effective range it is for baking, boiling, stewing, or roasting.

CLASS 46. *The best Field-Gate.*—Wightman and Denning, of Chard, offered a tubular iron gate, which, but for one mechanical error, would have been a pretty good production. Mr. Rowsell, of Buckland St. Mary, obtained the prize. The crooks and loops of this gate should have been as far apart as the hind piece will allow: the horizontal bars of iron between the wooden bars would have been better done away with. There is not any objection to the tension diagonal bar being of iron; but if wood is preferred, the hind piece should be made longer at the top to allow the diagonal bar to be dovetailed: the thick top bar in this case must be tenoned on one side. This gate, like the other, is far too expensive.

CLASSES 47 and 48.—*For the best Specimen of Fencing, &c., and for the best Self-acting Valve for discharging small Streams into Tidal Rivers.*—Nothing worthy of the several prizes was submitted for our inspection.

CLASS 49.—*The best and most useful Collection of Agricultural Implements.*—This prize was given to Mr. Bird, of Cardiff, for his well-selected array of almost every necessary implement, machine, and tool requisite for carrying on

the business of farming. Mr. Fry, of Bristol, obtained a second prize in this class.

A novel bone-mill, manufactured by Rea and Burns, of Liverpool, was put on trial with 10 cwt. of bones, a large portion of which was ground into fine pieces. This was accomplished, not after the usual manner of passing between two or more rollers, but by the process of rasping—an action which appeared to us to produce as good a sample of broken bones as by the mode heretofore practised. Unfortunately the trial came to an abrupt termination. This mill will always be liable to the same accident, unless the defect can be provided against.

Mr. Eddy exhibited a rotatory gravel screen; Mr. Eaton a lifting jack; Mr. Bird a hand-plough sledge, price 8s. We also observed some trussed whipple-trees, which we strongly advise farmers not to purchase. The defect in these whipple-trees is, that they are not equalising as soon as one horse is in advance of the other. A scale or weighing-beam is only perfect when the three bearing points are in one line. In each of these whipple-trees the middle bearing point is nearly one foot behind the other two points, consequently a high-spirited horse, by stepping in advance of his neighbour, may draw three-fourths of the load instead of one-half, without such a result being suspected by the ploughman. We trust we shall see no more of these unmechanical implements.

Mr. Wright and Mr. Rowsell exhibited American hay-collectors—an indispensable implement on a farm even where only a few acres of hay are grown. Messrs. Smith and Ashby had also their horse-rake.

Messrs. Richmond and Chandler had a root-washer, which could be easily raised out of the water and the vegetables emptied. Messrs. Sims, Pickley, and Co. (Stand 65) displayed some garden-seats, &c., which are cheap and ornamental.

Messrs. Lucas and Sons had some good steel gripes. The forks were defective, the shafts being much and unnecessarily weakened by being turned too deeply to fit the sockets: the sockets are too small. The prongs of some of the digging-gripen were square, and the sharp edge or diagonal was towards the resistance: this, although a very simple matter, materially weakens the prongs—besides it is far less trouble to the manufacturer to keep the flat side of the square or rectangle, instead of the diagonal, to the resistance. The latter method is undoubtedly adopted under the delusion that it is the stronger plan. A square bar of wood or iron will offer resistance, as nearly as possible, in the proportion of 10 stone when the flat side is in the direction of the strain, and only 7 stone when the diagonal is in this direction. We would respectfully suggest to the Council of the Bath and West of England Society that they should put a paragraph in the Birmingham and Sheffield papers, drawing the attention of the manufacturers of gripen and forks to these defects.

There were several descriptions of washing-machines exhibited. We had no means of testing their practical value; but there was one kind, the American ball-machine, which is anything but creditable to the manufacturer, inasmuch as it is so very unsubstantially made. We believe that many of these machines assist the operation of washing.

Mr. Tegetmeier, Muswell Hill, London, exhibited a bar and slide bee-hive. The hive is made of wood; but we think straw is a better material. With this objection we quite approve of Mr. Tegetmeier's system and invention.

Stand 76, Art. 4. Williamson, Brothers, Canal Iron Works, Kendal, exhibited a vortex turbine, which was said to be superior in some instances to the vertical water-wheel.

Stand 21, Art. 73. Mr. H. Bird, Cardiff, had Crosskill's Archimedean root-washer.

Stand 14. Messrs. Lowder and Son had some umbrella stands.

- Stand 13.** Mr. Archer, 251, High Holborn, London,
Stand 17. Mr. Lyon, 32, Windmill-street, Finsbury, London,
Stand 58. Messrs. Whitmore and Co., 11, Ray-street, Clerken-
well, London,
- }
- exhibited
mining
machines.
- Stand 21.** Mr. Bird, Cardiff,
Stand 8. Messrs. Hughes and Sons, Dover-road, London,
Stand 11. Messrs. Hupham and Brown, Exeter, Devon,
- }
- exhibited mill-
stones.
- Stand 63.** Messrs. Chanter and Co., Bow-road, London, exhibited what they termed a reciprocating fire-box furnace. Every other bar could be slightly moved backwards and forwards by a simple lever, which might break the slag.
- Stand 64.** Mr. Bridges, 146, Oxford-street, London, exhibited a large variety of butter-prints and other small articles for dairy use. This stand was well worth an inspection.
- Stand 17.** Mr. Lyon, 32, Windmill-street, Finsbury, London, exhibited two pair of ornaments in shells. They were very beautiful works of art.
- Robert Young, Bark House, Newport, Monmouth, exhibited a tool for planting forest-trees. It appeared to us an excellent instrument for the purpose. Unfortunately we could not find Mr. Young to show us how he used his tree-planter. Mr. Young's invention should not be lost sight of by those who are in the habit of planting extensively. The price in the catalogue is 10l.; but this may be a misprint.
- Mr. Eaton, of Kettering, Northamptonshire, exhibited a covered circular trough for sheep, which is a useful and cheap article.
- Mr. Reed, of Regent Circus, had water-engines, injecting-instruments, pumps, syringes, &c., all of which for utility and finish reflected great credit on the maker. The same encomium applies to Mr. Tree, of Blackfriars, who had a display of farmers' rules, cattle-gauges, barometers, thermometers, draining levels. We noticed also that Mr. Archer, of High Holborn, exhibited an ingenious apple-peeling machine, which, while it peeled the apple, at the same time removed the core.

WILLIAM LISTER.
THOS. SCOTT.

II.—*Report on the Exhibition of Live Stock at Cardiff.**

By ROBERT SMITH, Emmet's Grange, Exmoor.

THE invitation of our Welsh friends to celebrate the Society's seventh anniversary upon a sister land was well responded to. As a whole, the Cardiff Exhibition may be fairly described as a successful meeting. It is true the competition was varied, and we had our weak and strong points; yet, happily, in every class animals were to be found representing the true type of their respective breeds. This was essential to the fulfilment of the objects of the exhibition.

The breeders in the Western Counties have displayed their samples, and await the extension of their market. The animals from the adjacent neighbourhood, as also many from a distance,

* In this article is incorporated much of the information which appeared in the author's Report on the Live Stock at the Chester Exhibition, published in the Journal of the Royal Agricultural Society, vol. xix, pp. 352-400.

materially to the extent and consequence of the show. It is our satisfaction to record that the Society appears to have gained ground in public estimation, fellowship, and usefulness.

The Society returns to its western home with a vigour equalled and not excelled by any district society in the country. The importance of such gatherings cannot be too fully impressed upon the public. Whether we regard the object attached to the collection of show animals, or the purpose to be gained by bringing them together, we may safely say that the Society's meeting at Cardiff has sown the first seed of future enterprise in the agriculture of the Principality. While the Welsh farmers reflect upon the results they saw secured at the Cardiff meeting, they must not be indifferent to the object that such a display could only be realised by "unity of purpose;" that is to say, a combination of enterprise and good-will amongst the members, but more especially amongst the executive officers and members of council.

Not only for our neighbours, they will have the opportunity of experiencing a reciprocity of feeling at the North Devon Meeting in 1899, and thus aid our progress by cementing the intercourse extending the interests that are growing up on either side of the Bristol Channel.

With a view to best illustrate the extent of the competition at the Cardiff meeting, I quote from the Society's Report to the Annual Meeting:—

Of stock there were 137 exhibitors, viz.:—From South Devon, 74; Somerset, 15; Devon, 18; Cornwall, 1; Gloucester, Dorset, 0; Wilts, 6; and from other counties 13. The number entered for competition includes:—

Cattle.—Bulls 55, cows 35, heifers 56, steers 6: making a total of 152 cattle.

Sheep.—Rams 149, ewes 226: total 375 sheep.

Pigs.—Boars 17, sows 42: total 59 pigs.

Horses.—Stallions and colts 36, mares and fillies 64: or 100 horses and ponies. The grand total of live stock exhibited being

This exhibition shows an increase over that of last year of 167 head of stock.

Proceeding to notice the several established breeds of live stock exhibited at the Cardiff meeting, it may be interesting to commence with a short notice of their respective importance.

CATTLE.

Horns.—The North Devon cattle have long been recognised

as one of the earliest English breeds. Even in Vancouver's Report of the Farming of Devonshire (1808) they are mentioned "as an important breed of animals, active at work, and their aptitude to fatten unrivalled." Their natural locality is around North and South Molton; but they diverge from this neighbourhood in every direction, more especially to the eastward, where we find the Wiveliscombe and West Somerset classes of Devons; they then merge into other breeds, or are changed by climate and circumstance. The true type of the "old Devon" is peculiar to North Devon. Here they have long revelled in their bracing yet humid air, where nature clothes them in early autumn with dark curly coats, well adapted to their native home at the foot of the Exmoor mountain range.

They were amongst the earliest breeds to be removed from the home of their fathers; but they did not enjoy themselves on distant soils in equal ratio with other breeds, especially when destined to consume artificial food for the purposes of a corn farm; yet, as converters of vegetable into animal food—breed against breed—they were found to return as much per acre, or for weight of food consumed, as any other breed.

The Devon steer is described even from early times as being much sought after by the graziers and dealers from the Midland and South Midland counties. Vancouver states (1808) that the Devons were then declining in their general standard of excellence and numbers. He traces it to "the great demand which has been made for these cattle from other parts of England, where the purchasers (Mr. Coke and others) spare neither pains nor price to obtain those of the highest proof and beauty." Great merit is due to the late Mr. Francis Quartly, of Molland, who perceived that the best animals were being drawn from their native soil, and systematically purchased the choicest cows he could procure. Mr. T. D. Acland, in his 'Report of the Farming of West Somerset,' makes honourable mention of Mr. Quartly's patriotic and successful exertions.

It is to Captain J. T. Davy that Devon breeders are indebted for the 'Devon Herd-book.' He published his first volume in 1851, the second in December, 1854, and the third in 1858. It is admitted that these volumes contain a faithful report of the pedigrees of the greater number, if not all, of the best Devons. The fact that these Herd-books have been republished in the United States is strong corroborative evidence of their value.

The Devons were not well represented either by numbers or general quality; yet there was a sufficiency of good animals in each class to represent the true type of the Devon cattle.

CLASS 1. Bulls above 3 years old.—There were only 2 entries,

the "silver cup" being awarded to Mr. Thomas Webber for a bull bred by himself. This bull was deservedly admired, but the lack of competition in the class was unfortunate, more especially as a great display is usually made in it.

CLASS 2. *Bulls under 3 years old*: 4 entries.—These were useful animals, but not very brilliant as specimen beasts.

CLASS 3. *Bulls under 2 years*.—In this class were 9 entries, which were collectively of average quality and cast. A few of them may appear again at future gatherings, especially the first-class prize bull, exhibited by Mr. Merson, North Molton. This young bull instantly showed that he came from North Devon, and that he was "highly connected." No. 7, although good to touch, was scarcely pleasing to the eye, and in this particular failed to do justice to his ancestor of Yeovil celebrity.

CLASS 4. *In-Calf Cows*: 7 entries.—The Devon cow was not so well represented as in former years, and, as regards those exhibited, there was less uniformity in their character. The prize cow was an excellent representative of the Devon dairy cow, but not as a bull breeder. The second-prize cow was just the reverse.

CLASS 5. *Heifers under 3 years old*: 4 entries.—Three of these had less of the true type of the Devon than we had been accustomed to see at former meetings. The second-prize heifer, the property of Mr. James Davy, North Molton, was the only animal representing the family characteristics of the North Devon breed. She at once displayed the high descent of her ancestors—the Flitton herd.

CLASS 6. *Pairs of Heifers not exceeding 2 years old*: 3 entries.—Mr. Buller's prize heifers were very beautiful, and will be seen another day at future exhibitions. They do credit to the Downes Nursery. Mr. Merson's were good, but wanted the finishing elegance so peculiar to the North Devon.

In making a selection from the classes to represent the true type of the Devon cattle, we should select Mr. Merson's yearling bull, Mr. Davy's second-prize cow, Mr. Davy's second-prize heifer, and the pair of yearling heifers exhibited by Mr. Buller. These animals were of the sort to produce "male animals" in future years.

SHORT-HORNS.—The modern progress of this remarkable breed of animals is generally well known, but it is much to be regretted that we have no really authentic account of their origin. We have only a tradition pointing to their introduction from the Dutch provinces about the close of the seventeenth century into Holderness in Yorkshire. The short-horn combines in an eminent degree the qualities which have generally been considered

desirable in good and profitable animals. They have realized their breeders enormous sums of money, and both at home and abroad they are increasingly in request. In their early career they were designated as large and coarse animals, with a productiveness at "the pail" that would now excite incredulity. Such has been the result of good management, together with a knowledge of nature's dictates, that these animals have been completely modelled in "shape, quality, and popularity." Among the earliest of them were the old Teeswater, said to have been the foundation of the late Mr. Charles Collings's celebrated herd. Mr. Collings as a breeder, manifested a superiority of skill which, in a brief period, secured him an ample fortune.

It is to be regretted that this celebrated breeder, in common with the late Mr. Bakewell, of equal celebrity, left us no record of his views and plans in the art of breeding or rather improving domestic animals. In either case we have *prima facie* evidence that the object was to reduce a rugged and large frame down to symmetrical proportions. It is now the more difficult task of the modern breeder to maintain these elements, and yet keep up vigour and requisite constitution of a more "artificial animal."

The improved short-horns evidently date their first production and popularity from Mr. Day's exhibition in 1801 the "Durham ox"—an animal produced from a first cross with a common cow, by the famous bull "Favourite." Mr. C. Collings's sale of improved short-horned cattle took place on the 11th October, 1810, with the following results:—

17 Cows were sold for	£2802	9	0
11 Bulls ditto	2361	9	0
7 Bull calves under one year old, ditto ..	687	15	0
7 Heifers, ditto	942	18	0
5 Heifer calves, ditto ditto	321	6	0
47 sold for	£7115	17	0

Averaging 151*l.* 8*s.* 0*½d.* each!

Mr. R. Collings's sale followed, 29th September, 1818. this remarkable sale

34 Cows sold for	£4348	1	0
17 Heifers	1351	7	0
6 Bulls	1410	3	0
4 Bull calves	748	13	0
61 sold for	£7858	4	0

Averaging 128*l.* 16*s.* 5*½d.* each.

The Booth blood is now by almost universal consent recognized as the best tribe of short-horns in existence; they trace back to "Suwarrow" (636), bred by Mr. R. Collings, and the two bulls "Pilot" (496) and "Albion" (14), bought at the Collings's

by the Messrs. Booth. These turned out extraordinarily good getters, and gave this herd a good start, which has been maintained and carried on by zealous and skilful management, so that at the present time it is very popular.

Nearly three-fourths of the prize animals at the great exhibitions of the kingdom are either entirely of this strain of blood or have crosses of it. So much sought after are the bulls of this herd by breeders in all parts of the kingdom, that some of the more popular animals of the herd are bespoken six deep for hire for the season; a number are let for 200 guineas each, and not a few above that sum.

Mr. Stratton, of Broadhinton, is the leading breeder of short-horns in the western counties; he appears to have struck out a line or breed of his own. His remarkable herd has been chiefly bred from *one cow*, "Old Mossrose." This cow was bred from a cow purchased in Warwickshire (evidently a true short-horn). From "Old Mossrose" has sprung a considerable herd, no less than forty of which have been prize winners, some of them taking as many as twenty prizes each: some few have been successful at the Royal Society's meetings. Three prizes and two gold medals were awarded to them at the Paris meeting in 1855; and eighteen medals—fourteen silver and four gold—have been awarded to them from the Birmingham and Smithfield Club shows; clearly testifying that they possess good points and a good constitution. Up to September, 1858, Mr. Stratton had won 491 local and other prizes, amounting in round numbers to 3217l. 4s., besides seven gold and fourteen silver medals. Mr. Stratton has been a breeder of short-horns about twenty years.

The foreign trade in short-horns is at the present time an important incentive to the breeding of first-class animals as a remunerative department of agriculture. In America, Australia, France, and indeed over the whole continent, a demand has sprung up which there can be no doubt is only in its infancy; for independently of cultivating the pure breed in those countries, its use in crossing the native breeds for their improvement is of vast importance.

I may refer here to the 'Herd-book,' originally started in 1822, and edited by Mr. George Coates of Pontefract, but now conducted by Mr. Strafford, Euston-square, London, as the *authentic* register of the short-horned breed of cattle from their earliest existence, or at least from the date of the earliest registers kept by the first improvers of the breed.

The number of entries contained in the first five volumes issued in the course of twenty years amounted to 6699.

In 1842 Mr. Henry Strafford succeeded to the editorship, and has conducted the work up to the present time. During the period ending 31st December, 1857, he has published seven additional volumes, which contain the entries of no less than 15,537 bulls, together with cows and their produce during the past fifteen years. In future the 'Herd-book' will be made up at shorter intervals. It is confined to the British Isles. America, Australia, and France have now their own 'Herd-books,' founded on this, the parent one, to which most of the pedigrees refer in their original descent.

The entries of short-horned cattle exceeded those in either of the other classes. The elder short-horns were not, as a whole, well represented, although we observed an old favourite or two amongst them. The yearling classes held their own. The two-year old heifer class contained some beautiful specimens of animals combining size with quality. We observed five of these walking in line before the judges at one time, and to the eye of a lover of animal nature they were highly attractive. Mr. Stratton's baby "Bee," which was shown as one of a pair in the younger class, must be heard of another day: indeed, as heretofore, that gentleman's general contribution of stock added much to the attractions of the show-yard.

CLASS 7. *Bulls above 3 years*: 8 entries.—The old bull exhibited by Mr. Logan (bred by Mr. Stratton) was worthy of notice as a well-formed animal, with a large quantity of flesh of good quality. The bull exhibited by Captain Blathwaite was rather wanting in flesh, otherwise we should fancy the silver cup would have gone to Dycham: he was bred by the late Earl Ducie. The bull shown by Mr. Price of Bishton (also bred by Earl Ducie) possessed great substance and merit. No. 31, Mr. Miles's red and white bull, the winner in the young class last year, failed to show himself in his Newton colours.

CLASS 8. *Bulls not exceeding 3 years*: 8 entries.—Amongst the bulls in this class there was nothing remarkably good. Mr. Stratton's bull "Victory" is well shaped, but not so well up in the "touch" as some of his relations. The Hon. Mr. Bouverie's bull "Frantic" is of large size, but scarcely equally proportioned between his hind and fore-quarters.

CLASS 9. *Bulls not exceeding 2 years*: 7 entries.—In this class were several useful animals, but the real stamp of a yearling short-horn bull was wanting. The prize bull, though tolerably formed, was by no means prepossessing in countenance.

CLASS 10. *In-calf Cows*: 9 entries.—The two prize cows,

belonging to Mr. Stratton, were symmetrical in form and of good quality, but rather highly fed for "dairy cows." The highly-commended cow, exhibited by Mr. Bowley, was a good specimen of a well-bred dairy cow.

CLASS 11. *Heifers not exceeding 3 years* : 14 entries.—As before observed, the principal interest of the short-horn classes was centred in the heifers. The judges must indeed have had a task to determine their relative excellence. Mr. Stratton's and Mr. Starkey's were the prize heifers, and Mr. Logan's was well up in the race. Mr. Starkey's heifer showed symptoms of over-feeding, which probably influenced the decision of the judges, for she is true in all her points and of great substance. Mr. Stratton's is even throughout, and of good quality of flesh. Mr. Logan's was very symmetrical and girthed well, but it is understood she was thought rather too low on the legs. Mr. Shattock and Mr. Entwistle also exhibited two heifers of great size and of fair quality.

CLASS 12. *Pair of Heifers not exceeding 2 years* : 7 entries.—The yearling heifers by no means came up to the 2-year olds. These were moderate specimens of the short-horn, with the exception of one of Mr. Stratton's pair, which was universally considered a perfect gem, and, if we mistake not, will again and again be distinguished by the "blue ribbon" of this and other Societies.

HEREFORDS.—This breed of cattle is clearly assignable to the "Middle-horn" tribe: they are considered to be an aboriginal breed, and descended from the same stock as the Devons. Little is known respecting their origin, further than that for many generations they can be traced as the peculiar breed of the county from whence they take their name. Yet a few years since they were not of the same uniform appearance of colour as now, there having been some herds self-coloured like the Devon and Sussex breeds, and opinions have been published that this was their original character. Subsequently we find the grey, the mottled, and the white-faced, each with their distinct admirers and their successful breeders. This subdivision of a race of animals (it may be readily imagined) would occur from the use of a self-coloured bull with a white-faced cow, or the reverse; but that the race was originally red with a white face, is clearly indicated by the almost perfect uniformity of colour which the breed of the county now presents. The Hereford cattle have hitherto been held in high estimation for the rapidity with which they feed and the quality of their flesh, together with the working

powers of the oxen, which display the activity of the Devon combined with the strength of the Durham.

The calves usually run with their dams in a natural state—a rude state of things which the breeders ought to alter, as its present effect is to depreciate the value of the whole race. In this thickly-populated kingdom it is necessary that both milk and flesh be produced. We hope to be excused for making this allusion, particularly as we are aware that not only can these cattle be greatly improved by cultivation, but that their milk is of a superior quality, and yields a return equal to that of any other breed possessing similar pretensions to flesh.

Among the earliest breeders of celebrity, of whom anything is known, the names of Tully, Yeoman, Skyrene, Williams, and Weyman, may be mentioned as some of the most successful. Subsequently those of Tomkins, Price, Hayton, Jones, Hewer, Jeffries, Knight, and Smithies. These, too, have passed away; and in our present day we see recorded in the Society's Journals an increasing number of competitors from different parts of the kingdom. This proves that the value of the breed is becoming more appreciated. A few years since they were almost exclusively in the hands of the tenant farmers of their native county; they now form the principal breed of the counties of Monmouth, Radnor, Brecon, Salop, and parts of the counties of Gloucester, Worcester, Warwick, Stafford, Wilts, Herts, Dorset, Somerset, and Cornwall. There are also some good herds in North Wales and Scotland, for which districts their hardiness of constitution, thick but mellow hides, wavy, soft, and moderately long hair, render them peculiarly adapted. Recently a considerable number have been exported to America and the Australian colonies, where they are rapidly gaining favour. It is much to be regretted that no correct pedigree of this breed was kept until T. C. Eyton, Esq., of Eyton Hall, Salop, exerted himself to collect information, and condense it in a 'Herd-book.' His first volume appeared in 1846; but although he urged the necessity and value of such a work, it was not appreciated, and after publishing another volume in 1853 he expressed his intention of discontinuing it. The late W. S. Powell, Esq., of Hinton Court, Hereford, then purchased the copyright, and commenced the third volume: but his sudden death stopped the progress of the work. Breeders, however, began to see its value from the question of pedigree being repeatedly raised by those who sought to purchase, and the copyright was purchased of the representatives of the late Mr. Powell by the Committee of the Herefordshire Agricultural Society, who selected Mr. Duckham, of Baysham Court, Ross, to conduct it. This he has done with great perseverance; and

although only twelve months have elapsed since he commenced his labours, he has published his first volume (the third of the work), and for the first time has added the cow pedigrees and their produce. The number of bulls in the two first volumes is 901; they now number 1477.

The Hereford race of cattle were represented by some choice specimens of the breed. They were principally from the county from whence they take their name, but there were several good animals from Brecon, Monmouth, Glamorgan, Carmarthen, and Pembroke. In all, they numbered 31 head.

CLASS 13. *Old Bulls*: 5 entries.—It was in this class that the lion of the show, Lord Bateman's magnificent old Hereford bull "Carlisle" made his appearance. This animal, from his immense depth and proportionate length of carcase, proved to be the largest animal in the yard. He displayed a beautiful, placid countenance, and, with great constitution, combined that superior quality of flesh for which this breed of cattle has long been distinguished. His long, deep carcase contrasted very strikingly with his peculiarly short legs. The Tredegar bull very properly received the high commendation of the Judges. Mr. Taylor's bull was also a useful animal.

CLASS 14. *Bulls under 3 years*: 4 entries.

CLASS 15. *Bulls under 2 years*: 8 entries.—The above two classes were represented by fair average specimens of the Hereford family. These (owing to the unusual display of Lord Bateman's old bull) were not sufficiently noticed by the public.

CLASS 16. *In-calf Cows*: 5 entries.—In this important class the cows were somewhat weak in number. If we except Mr. Morgan's neat cow, this class was also deficient in the characteristics of modern breeding.

CLASS 17. *Heifers under 3 years*: 5 entries.—The two prize heifers, Nos. 104 and 105, were splendid specimens of the Hereford breed. They at once impressed the spectator with the idea that the veteran exhibitor, Mr. Wm. Perry, had more of the *same* family at home.

CLASS 18. *Heifers under 2 years*: 4 entries.—Here, again, we are encouraged to breed on, and believe in the adage that "like begets like." Lord Bateman's prize heifers are perfect models, and immediately descended from his Lordship's prize bull "Carlisle," already spoken of.

With a view to public information, I give a tabular statement of the girth of the principal prize animals.

AVERAGE AGE AND GIRTH OF PRIZE CATTLE.

Number of the Class.	Number of Entries.	Average Age of Prize Animals.		Average Girth of Animals.
		Years.	Months.	Feet.
DEVONS.				
Aged Bulls	2	3	4	7
Cows	7	8	3	6
Two year old Heifers	4	2	6½	6
SHORT-HORNS.				
Aged Bulls	8	7	1	8
Cows	9	3	7	7
Two year old Heifers	14	2	2½	7
HEREFORDS.				
Aged Bulls	5	5	8½	8
Cows	5	7	1½	7
Two year old Heifers	5	2	6	7
EXTRA STOCK.				
Short-horn Cow, No. 445	..	5	2	7

SHEEP.

LEICESTER, OR LONG-WOOLLED BREEDS (not qualified to compete as Cotswolds).—The Leicester, as a lowland sheep without a rival, and has improved the other long-woolled sheep if it has not given them their principal value. It is curious to trace the origin of this class of animals. This race of sheep created by the late Mr. Bakewell,* at whose suggestion a Society was formed at Dishley, Leicestershire, whereby certain rules laid down for the guidance of his supporters.

The first meeting of the Society was held at Dishley in 1

* M. Laverne in his interesting work, 'The Rural Economy of England' (Blackwoods, 1855), describes Bakewell as "a man of genius in his way has done as much towards enriching his country as his contemporaries Arkwright and Watt." Before his time English sheep were not fit for the butcher till five years old, but after great perseverance and expense he succeeded in breeding them for the food-market at two years old, thus doubling the produce of the flock. As every one desired to have the Dishley blood, it occurred to Bakewell to let out his rams instead of selling them. At first (A.D. 1768) this only brought him in about a pound per head, but "in proportion as he continued to make progress, and the reputation of his flock increased, his prices rose rapidly; in 1789, a society having been formed for the propagation of his breed, he let his rams to it for one season, at the enormous price of 6000 guineas. It has been estimated that in the following years the farmers of the Midland Counties spent much as 100,000*l.* a year in the hire of rams."—*Laverne*, p. 19.—[Ed.]

and it may be both useful and interesting to notice a few of the resolutions adopted by the members.

"Resolution No. 1.—We, whose names are underwritten, agree to pay into the hands of Mr. Honeybourn (treasurer) the sum of 10 guineas each, in such sums, at such times, and for such purposes, as shall hereafter be agreed upon by the majority of the subscribers.—Wm. Walker, T. P. Stone, J. Bennet, J. Manning, J. Robinson, N. Stubbins, N. Buckley, R. Bakewell, F. White, J. Breedon, and S. Knowles.

"No. 2.—That Mr. Paget be President of the Society."

Three Crowns, Leicester, 5th January, 1790 :—

"Resolution No. 4.—That secrecy be kept by all members respecting the business of these meetings, except to absent members; and that any member quitting the Society keep secret, upon his honour, the transactions before he left it.

"No. 5.—Resolved, That no ram, the property of Mr. Bakewell, shall be let to, or in part used by, any ram-breeder but such as will engage not to let any rams at *fairs or markets*.

"No. 8.—That no member shall give his rams, at any season of the year, any other kind of food than green vegetables, hay, or straw.

"No. 13.—That no member shall let a ram, share or part of a ram, to any ram-breeder residing within 30 miles of Leicester, not being a member, who hired a ram of Mr. Bakewell last season, 1789.

"No. 27 (passed May 12th, 1794).—Resolved, That no ram shall be let to any ram-breeder at less than 40 guineas, supposing him to let 6 rams, or, if only 3 rams, 20 guineas."

Dishley, June 4th, 1794 :—

"No. 30.—The members shall not show more than 24 rams to any person or company at one time."

Loughborough, June 4th, 1795 :—

"No. 37.—Resolved, That no ram shall be let to members of the *Lincolnshire Society* in classes at less than 200 guineas.

"No. 41.—That no member shall sell any ewes in future, except to kill, at less than 10 guineas each."

Leicester, May 11th, 1796 :—

"Resolved, That whoever deals with Mr. —, of —, shall pay to the Society 50 guineas. That not less than 100 guineas be taken from any of the persons whose names are hereafter written for their first contract for one ram, or, if two people join, not less than 200 guineas, after which the price to be 30 guineas for wether-getters."

Here follow the names of 57 breeders: amongst them are dukes, marquises, lords, and baronets.

By the reading of the 37th Rule it would appear that some jealousy was at hand with the Lincolnshire breeds. This is subsequently proved by a meeting held at Lincoln, July 13th, 1796, when it was unanimously agreed "that a society of breeders of the Dishley breed is necessary for the improvement of the breed, and for the benefit of the public."

"Resolved, That no one shall show any ram at a market, and that no one shall let more than 100 rams in one season.

30 *Report on the Exhibition of Live Stock at Cardiff.*

"Thanks to Mr. Marfleet for this meeting. Adjourned to 9th August next. Signed by 10 Lincolnshire breeders, viz.:—Isaac Marfleet, Joseph Rogerson, Ph. Skipworth, Jno. Dudding, Wm. Cook, Rd. Ostler, Geo. Moody, Wm. Thorpe, Sam. Slater, and Benj. Codd."

As a proof of the high estimation in which the Dishley breed was held, I give an extract from an original letter:—

"Oastine Hall, Sept. 25th, 1797.

"DEAR SIR,—Mr. Astley has determined to send (with your approbation) 50 ewes to Holmpierrepont, for the tupping of which, by the shearing and two shear, drawn equally to each, he will give you *four hundred guineas*. Your immediate answer by a special messenger to-morrow will oblige

"Yours, &c.,

"THOS. TOMALIN.

"To Mr. N. Stubbins."

The sheep designated long-wools are a cultivated sheep, obtained by the use of the Leicester ram with the different local breeds. These are useful animals, and still maintain their district celebrity as a hardy race.

In this class, No. 19, for yearling rams, there was a bountiful supply, there being 33 entries, of which 32 were from the flocks of ten established breeders in the West of England. The competition also was very interesting. The first prize was awarded to the veteran breeder Mr. Bodley, of Stockley Pomeroy, Crediton; the second to Mr. Partridge, of Bow, Crediton; and the third to Mr. Potter, Yellowford, Thorverton. Amongst the unfortunate there were also some useful animals, but others would have been better at home.

Aged Rams: 21 entries from 14 exhibitors.—There were several animals in this class possessing great size and merit. The first prize was awarded to Mr. J. Partridge's two shear, the second to Mr. Watkins's three shear. The judges had no hesitation as to the first award, but considerable time was occupied in making the second. However, Mr. Kingdon's ram was highly commended, and deservedly so. Mr. Bodley had an excellent sheep in this class, which was commended. This collection of aged Leicester rams must have surprised our Welsh neighbours.

There were 5 entries in the class for breeding ewes: 2 from Devon, and 3 from South Wales. The prize was awarded to Mr. J. Kingdon, of Thorverton, Devon.

Two-teeth Ewes: 4 entries.—The prize was awarded to Mr. Corner, Torweston, Williton; the second to Mr. Buller, of Downes, Crediton.

COTSWOLD SHEEP.—The Cotswolds are of ancient date, their original office having been that of enduring the climate of the wild and then uncultivated Cotswold hills. They have since been remodelled by successive breeders until they have now

attained a very high position amongst the "established breeds." They are chiefly bred in the county of Gloucester and surrounding districts, and are not unfrequently called "Gloucesters," but this name has now become merged into the one title of Cotswolds. As a remodelled breed they are much indebted to the Leicester blood; they retain, however, their original Cotswold characteristics of size, fleece, and lean meat. True it is that the Leicester has improved them, but they do not improve the Leicester. The rams of this breed are sold annually about the month of August.

CLASS 23. *Yearling Rams*: 14 entries.—These were of good size and merit, especially the prize sheep. Mr. Beale Brown received the first prize, and Mr. Handy the second. These names at once attest that they were highly-descended animals.

In CLASS 24 was an entry of 9 aged rams, which certainly reflected great credit on their owners. Here again Mr. Handy exhibited a magnificent ram, which many considered the best in the yard. The second prize was awarded to Mr. Tombs; this also was a valuable sheep.

The Ewe Class contained only 2 entries. Mr. Smith's ewes received the prize.

CLASS 26, for young ewes, was also thinly represented. Mr. Beale Brown received the first, and Mr. Smith the second prize. These were excellent specimens. No. 201 was disqualified by unfair shearing.

COTSWOLD OR OXFORD DOWNS.—In the two classes set apart for this breed of sheep there were only 4 shearling rams, and one pen of two-teeth ewes. Mr. Tombs and Mr. Flemming were the only exhibitors and received the prizes.

SOUTH DOWNS.—These sheep, like the Leicesters, are destined for a particular purpose; they are unquestionably the best animals we have "as a working flock;" they feed more readily upon elevated situations and on the natural pastures and heaths of open lands: for the purpose of folding they are unrivalled. The country is much indebted to the early founders of this admirable class of sheep. The late Mr. Ellman was mainly instrumental in carrying on this great work. Subsequently others have given their aid; amongst them Mr. Ellman's successors at Glynde, the late Mr. Grantham, Mr. Jonas Webb, the Duke of Richmond, Messrs. Rigden, Overman, Sainsbury, &c., are most familiar to our ear.

The South Downs are chiefly bred in the counties of Sussex, Surrey, Hants, Wilts, and Dorset; there are also several eminent breeders in Cambridgeshire, Norfolk, and Suffolk; in fact few

English counties are without them. They prosper best upon dry soils.

Yearling Rams: 14 entries.—Mr. Neville Grenville of Butleigh Court, carried the first prize, and his Grace the Duke of Beaufort the second. In the class for aged rams the Duke of Beaufort received both prizes; he also took the prize for aged ewes.

The first prize for two-teeth ewes was awarded to Mr. Lucas of East Coker, Yeovil, and the second to the Duke of Beaufort.

Several pens of beautiful sheep in the Southdown Classes were disqualified in consequence of unfair and early shearing.

SHROPSHIRE OR HAMPSHIRE DOWNS.—The Hampshire sheep are clearly descended from an original hardy race peculiar to the county, possessing in early days the same bony characteristics as the long-woolled Lincolns. They have partaken of the improvements of other breeds; but their strength of constitution and size have been retained as characteristic of the animal, less attempt having been made to imitate the beauty and high proof of the Southdown. These sheep, as seen in numbers upon their native soil, are bold rent-paying animals. As show sheep they have not reached the requisite uniformity of cast and quality.

The Shropshire sheep also date their origin from an old county breed—the Morfe Common sheep, which old accounts describe as having “thick coats, and peckled faces.” The Royal Agricultural Society’s meeting in 1845 first introduced this breed to public notice, and sales of rams were then made at from 5*l.* to 7*l.* each, and of ewes at about 2*l.* each. Then followed the special classes opened for them at the Gloucester Meeting in 1853. They had now obtained a great name for robustness of form and wool, as a dark-faced, short-woolled sheep, and large prices were realised. On some occasions rams reached an average of 20*l.* each, and ewes made 5*l.* to 10*l.* each. In one instance 78*l.* 15*s.* was realised for a pen of five ewes. Their average weight of wool over a whole flock is from 6 to 7 lbs. per fleece. One of the oldest flocks, from which many of the best sheep are descended, was that of the late Mr. Mines, of Berrington, near Shrewsbury, established upwards of ninety years ago. These were originally a large “peckled-faced” breed, and then made 25 lbs. per quarter at two years old without artificial food. The fancy of breeders has since turned more to self-coloured faces, the “peckled-faced” ones are rejected as breeding sheep, and by degrees, with proper selection, they have become uniformly of a grey colour; some families, however, being much darker. Attempts to improve the breed by crossing have proved a failure. With the South-

down cross the result has been a loss of size and wool, and with the long-woolled sheep there has been a loss of character in coat and quality.

Yearling Rams.—In this class were ten entries: these were from the flocks of Messrs. J. Moore, E. Holland, G. Harbin, and Mathewson; the first and second prizes were awarded to Mr. Moore.

Aged Rams: 4 entries.—Mr. Traherne and Mr. Gorsed received the prizes.

The prize for Aged Ewes was awarded to Mr. Harbin, who also received the first prize for two-teeth ewes; the second prize was assigned to Mr. Moore.

SOMERSET AND DORSET HORNS.—*Yearling Rams.*—Both the prizes in this class were awarded to Mr. Danger, as also the prize for the aged ram; these collectively were three valuable male animals.

The aged ewes were also remarkably good; the prize was gained by Mr. Templeman, who, in addition thereto, exhibited the best pen of two-teeth ewes; Mr. Danger was the owner of the second best. This class of sheep has been rapidly improved of late years, and now holds a high position at our annual gatherings.

MOUNTAIN SHEEP.—As this class was open to all mountain districts, it was looked forward to with considerable interest, and entries were made from both sides of the Channel.

In CLASS 41, for *Rams of any age*, were 13 entries, viz.—2 from Sir Thomas D. Acland, Bart., and 3 from Mr. Merson, North Molton, on the English side, and 8 from Messrs. Fothergill of Tredegar, Mathewson of Rhiswen, Williams of Great House, Llangattack, and G. Clarke of Dowlais, on the Welsh side.

In the CLASS for *Ewes of any age* were 8 entries, viz.—2 by Sir Thomas D. Acland, Bart., 2 by Mr. Merson, 2 by Mr. Clarke, and 2 by Mr. Richards of Spitty Farm, Abergavenny. The competition, collectively speaking, was about equal, but not so with regard to quality; all the four prizes having been awarded to Mr. Merson for his very beautiful specimens of Exmoor sheep. A third ram of Mr. Merson's was highly commended.

The sheep exhibited by Sir Thomas D. Acland were highly commended. Amongst those exhibited by the Welsh breeders, were some good ewes belonging to Mr. Richards; the lambs were especially good. These sheep were much longer and taller than the Exmoors, but wanted their depth of carcase.

The ewes exhibited by Mr. Clarke were too low in condition to compete for a prize.

An interesting account of the Exmoor sheep and their management will be found in Mr. Tanner's Prize Essay upon the 'Sheep of the West of England,' at page 60 of the present Journal.

The Welsh sheep call for a few remarks from their hitherto secluded position. They have been described as an aboriginal race, enjoying their freedom over the mountain ranges. An early writer upon the mountain breeds of Wales says of them:—

"Some are horned, others polled; some are nearly white, others of every intermediate hue between a dirty white and a perfect black. They all, however, agree in the following particulars:—The head is small; the neck long, erect, and delicate; the forequarters light, with narrow breast and shoulders; the sides flat, the back and loins narrow, the legs slight and long; the animals possessing considerable agility and an unquiet habit, so as to render them most annoyingly troublesome when attempted to be kept in the small enclosures of the vale. The fleece weighs about 2½ lbs."

Here we have a pure aboriginal animal before us, untouched, as are their pastures, by the hand of the husbandman, and exactly what "ought not to be." The question now arises, Can this state of things be improved? if so, how, and by what means?

Much has been written on animals adapting themselves to climate and hardships: surely these hitherto neglected breeds may be assisted in all that relates to a mountain life. If we turn to Scotland we find that the mountain race of sheep has been attended to in full ratio with other breeds, for, while they have their hardy black-faced sheep even to the summit of their loftiest mountains, we find them cultivating the hardy Cheviot at the middle altitude; and even up to some 400 or 500 feet they cultivate the Leicester. These are instructive examples for the Principality. Some fifty years since the sheep-farming of the mountains of Scotland was merely a nominal affair for both sheep and shepherds; it is now one of the staple returns of the northern counties. In reply to my inquiries, Mr. Hugh Watson, of Keillor, Cupar-Angus, whose celebrity as a breeder is so well known, writes thus:—

"The Welsh mountain sheep are not worth cultivating. Their quality of mutton is said to be fine-grained and high-flavoured, which must be the effect of the herbs they feed upon, for the animal itself is ill-shaped, and must be hard to feed. They never can be made *rent-paying* animals. Could they not be supplanted by the black-faced mountain breed of Scotland, that feed on the highest elevations of that country, and yield very delicate and high-flavoured mutton, and are twice the size of the Welsh mountain sheep? Where there is herbage sufficient to maintain them (which is not the case on the highest mountains in

Scotland), the Cheviot sheep are a fine race, with mutton of first-rate quality and valuable wool; they are found in the greatest perfection on the green Cheviot range of hills in the south of Scotland, near the English border; and are now equally thriving on the pastures of Sutherland, Caithness, and Inverness-shires, but not on the most elevated mountains, these being occupied by the Scotch black-faced mountain sheep, a race well adapted for their wild range.

AVERAGE AGE AND GIRTH OF THE DIFFERENT PRIZE SHEEP AT CARDIFF.

Number of the Class.	Number of Entries.	Average Age of Prize Animals.		Average Girth of Prize Animals.	
		Years.	Months.	Feet.	Inches.
LEICESTERS.					
Shearling Rams	33	1	3	4	2
Aged Rams	21	3	3	5	0½
Ewes	5	..	..	4	1
Two-teeth Ewes	4	1	3	4	0
COTSWOLDS.					
Shearling Rams	14	1	3	4	4
Aged Rams	9	2	2	4	11
Ewes	2	2	3	4	5½
Two-teeth Ewes	3	1	3	4	2
COTSWOLD, OR OXFORD DOWNS.					
Shearling Rams	..	..	..	..	..
Two-teeth Ewes	1	1	3	3	8½
SOUTH DOWNS.					
Yearling Rams	15	1	3	3	8½
Aged Rams	7	2	3	4	0½
Ewes	3	3	3	3	10
Two-teeth Ewes	7	1	3	3	7½
SHERBOPSHIRE OR HAMPSHIRE DOWNS.					
Shearling Rams	10	1	3	3	9
Aged Rams	4	2	2	4	0½
Ewes	3	..	..	3	8
Two-teeth Ewes	6	1	4	3	7½
SOMERSET AND DORSET HORNS.					
Yearling Rams	3	1	4½	3	8
Aged Rams	1	4	4	3	10
Ewes	1 { 3	3	6	4	2½
Two-teeth Ewes	2 { 2	2	6	3	9½
MOUNTAIN SHEEP.					
Rams of any age	13	{ 2 3 3 3 }		4	0
Ewes of any age	8	4 and 5 yrs.		3	9

Comparative Girths of Short-woolled Sheep.

					Feet.	Inches.
Aged Rams	South Down .. ..	.. ..	.. ..	.. ..	4	1
					4	1
					4	0
					3	10
					2	9
Ewes	South Down .. ..	.. ..	.. ..	.. ..	3	10
					3	8
					3	9
					4	2½
					3	3

Long-woolled Sheep.

Aged Rams	Leicester .. ..	.. ..	.. ..	.. ..	5	1½
					5	0
Ewes	Leicester .. ..	.. ..	.. ..	.. ..	4	1
					4	5½

THE HORSE.

The breeding of the horse is a national subject, but as yet has not been treated as such. There is a want of system in our arrangement and management. In fact he is not a popular animal to breed. If we discuss the subject with the arable farmer, and press upon him the importance of this "lucrative branch," he at once meets you with "Tis not my business." If with the grazier, he replies, "They disturb my cattle." If with the amateur, he has "no fields or sheds." If with nobles of the land, "None but a thoroughbred can ever pay."

These objections are vague, but there is a certain amount of truth in them. Hence the production of this valuable animal is generally ill-regulated and unsystematic. As instances to the contrary, however, where *system* is adopted, we may point to the Yorkshire coach-horse, the Suffolk punch, the Lincolnshire dray-horse, the Clydesdale horse, and the mountain pony.

Agricultural Horses.—The active clean-legged bay, brown, or black horse, is best for agricultural purposes, while the *heavy* horse is best adapted to the London dray and such other work as requires power by weight of carcase.

The *Dray-horse*, in its true sense, is an animal produced from the early crossing of our English mares with robust Flemish horses. They are only produced in such districts as are proverbial for their deep rich pasture lands, such as the Lincolnshire and other eastern marshes, also those of Somerset and some rich midland pastures. South Lincolnshire has been most famous for this class of horse; great numbers leave it as colts for the upland counties, where they are gently worked for a few years, and sub-

sequently sold to London and other dealers. The breed being a *general* one, it would be unwise to mention any names as leading breeders. The autumn fair at Thorney, on the borders of South Lincolnshire, as also Rugby and Waltham in Leicestershire, are justly celebrated for their display of heavy cart colts. They are usually sold at two and a half years old. The agricultural or single-harness horse is an animal upon which devolves the quick movement of the farm. With our changing agriculture, this horse has to a great extent been remodelled, but there yet remains the great work of more generally distributing him throughout the country. Take the best Clydesdale horse as a pattern: he is all you want—quick, staunch, enduring, and hardy; his cast, style, and barrel-like form, are alike conducive to his daily work, especially in a hilly country.

The Clydesdale horse owes its origin to one of the Dukes of Hamilton, who crossed some of the Lanark mares with stallions that he had brought from Flanders. The southern parts of Scotland, and some of the English counties, are supplied from this district; [they make a great display at the Glasgow and Rutherglen fairs, where the dealers from the south go to meet them. The Suffolk horse is another English draught-horse for the farm, the cart, or the lighter dray work. Though peculiar to the county from whence they take their name, they have of late years found their way into almost every corner of the island. The old "Suffolk Punch" has now become extinct. It was a thick short-legged description of horse, with rather a plain head, and a short low forehead; it could nevertheless trot from seven to eight miles an hour in light harness, and was usually ridden by the farmer. The Suffolk horse is invariably chesnut, although of different shades; there are the *dark*, *bright*, *silver-haired*, and *red chesnut*; all of these have their admirers, but the pale coloured are least fashionable.

CLASS 43.—In this class for mares and foals were 11 entries, which, collectively, formed an excellent show of animals. The first prize mare, exhibited by Mr. Lowrie, of Caddoxton, was very compact, powerful, on short legs, active, and possessing a firm constitution. Mr. Logan's second-prize mare was a very useful animal, with great activity.

In the class for 2 year-old colts were 7 entries, and in the class for 2 year-old fillies 4 entries. Messrs. Logan's and Lowrie's were the only animals possessing any particular merit, and to these the two first prizes were awarded.

In CLASS 46, for *Yearlings*, Mr. E. Holland, of Dumbleton Hall, exhibited a very promising young animal; Messrs. Logan and Lowrie had also some very good specimens. There were 12

entries. Mr. Holland obtained the first prize, Mr. Logan the second, and Mr. Lowrie's animal was commended.

Hacks or Hunters.—The real hackney or galloway, when well produced, may be justly deemed a treasure; the first cross from a full-sized pony mare with a small thorough-bred horse is generally the real animal for safety, quickness, and endurance.

The *Cob* is a more difficult animal to breed, and its successful production is more the result of chance than of any well-matured system. The real cob, from his enormous strength and robust form, must partake freely of the active cart-horse, combined with a pony mare of opposite qualities.

The Hunter.—The altered character of foxhounds and the additional speed they have acquired compel all men to ride a better horse. Stoutness is still required, but blood has become an essential quality. How, then, shall we produce him? From the best parentage, regardless of trouble, distance, and, I had nearly said, expense.

CLASS 47. *Mares for breeding Hacks or Hunters.*—The wording of this class is rather vague. Supposing we have two good animals, one being well adapted for breeding a hunter and the other for breeding a hack, which shall win? However, this difficulty has not yet practically occurred. The first-prize mare, belonging to Mr. Hugh Entwisle, possessed great merit; she is exceedingly well bred, very handsome, and an elegant mover.

In Classes 48 and 49, for colts and fillies, there were two first-rate animals in the yard. In Class 50, a three-year old grey colt, by Chanticleer, exhibited by Mr. Ballard, near Cowbridge, took the first prize. This colt is eminently calculated for getting weight-carrying hunters: his action is perfect.

In reviewing the exhibition of horses in the several classes, it may be said with truth that collectively these classes were well represented, and contained some exceedingly good animals.

The Pony.—The mountain pony is an indigenous animal peculiar to our mountain ranges, whereby the rough grasses, which would otherwise decay and be lost, are turned to account. The original pony has been much improved; the native pony of the New Forest in Hampshire was enlarged and improved by the presence of "Old Marske" amongst them; the Exmoor pony, by an infusion of the English thoroughbred and Dongola horse; many of the Welsh ponies have been crossed with the Norwegian; the Dartmoors are nearly extinct; the Highland pony is still the old hardy animal nature formed; the Shetland pony of the northern Scottish isles is still diminutive, but beautiful. The infusion of larger males amongst the old mountain race has increased their bulk, while their pony form and hardy constitution have been

preserved. The severity of winter-storms drafts many an inferior animal from this larger breed, leaving the breeder to reflect on the inevitable operation of nature's laws.

In the class for *Mare Ponies of any breed*, not exceeding 14 hands, Mr. G. Trahirne, of St. Hilary, Cowbridge, had a very neat grey mare, a perfect hack, to which the first prize was awarded. One belonging to Mr. J. Thomas, of St. Hilary, was a very substantial weight-carrying cob, but deficient in quality: this pony received the second prize. Ten entries.

The *Mare Ponies* under 13 hands were well represented. Mr. John Williams, of Splott House, Cardiff, was the owner of the first-prize mare, which was very neat, beautiful in form, colour, quality, and movement. The second-prize mare, belonging to Mr. J. Leyshon, of Bridgend, was highly bred, neat in appearance, but did not stand well on her forelegs. This was a prevailing fault in this class, if we except the first-prize animal. Fifteen entries.

In the class for *Pony Stallions of the Welsh breed*, not exceeding 14 hands, were five entries. A nine-year old brown pony, exhibited by T. W. Booker Blakemore, Esq., M.P., which received the first prize, was a perfect example of what a pony should be. He possessed a beautiful form, immense power, fine constitution, and great activity. Mr. Griffiths, of Lligginstone, received the second prize for a clever, hardy animal, and an excellent mover. Although there were some really first-class animals, the ponies generally did not manifest that uniformity of character that was expected from so far-famed a race. There is not that characteristic family likeness among them that is so strongly developed in the Exmoor.

The *Welsh Mountain Pony* was not well represented. Newspapers do not circulate freely amongst the hills, and probably but few of the breeders of this stock were aware of the premiums offered, or of the corner so invitingly kept for them in the exhibition yard. From what we can learn, however, from those acquainted with the subject, there are not (except amongst the ponies bred on the highest mountains) any very peculiar features marking them as a distinct class, such, for instance, as those which characterise the Arab, the Barb, or the English thorough-bred. These mountain ponies, on which I shall first remark, whether from the influence of soil and climate producing like effects, or may be from descent (for some of the Welsh affirm that they were brought from the Holy Land in the time of the Crusades), do certainly possess some peculiarities betokening a fixity of type not found in other breeds. As experience has hitherto shown that any improvement in size, by crossing with larger breeds, has always been purchased at the cost of hardness of constitution, they have been left pretty much to themselves.

Speaking of them as a body, it will be found that they nearly answer the following description:—The head is short and not ill-formed, with a bold prominent eye, small ears, and rather thick in the jaw; the shoulder flat but slanting—low in the withers; the neck short and inclining to the ewe-neck; barrel round and deep, and well ribbed up; if anything, rather too narrow across the loins; the hind quarter too short, and drooping to the tail. They are all, more or less, cat-ham'd, which gives them an unsteady gait in trotting; bone and sinew good, and legs as clean as a thorough-bred; the thigh very powerful, more so in proportion than the forearm; hoofs very small, but so firm that, if used on the mountain only, they hardly require shoeing. Like the mountain sheep and the hare, they seem to be especially qualified for going up hill; height little above 11 or at most 12 hands; very sure-footed—a broken knee seldom to be seen amongst them. They, however, are not of that generally useful class which would always command a market; but not being bred in any very great numbers, they have of late years met with a ready sale, and are bought principally for the purpose of carrying children.

With regard to the ponies bred on the lower hills and commons in South Wales—particularly in the line of country touching upon Tregarren, Rhayada, Bailth, Landimdul, Pennebrul, in the counties of Cardiganshire, Brecknockshire, Carmarthenshire, and Radnor, up to Knighton—though they vary much in form, strength, and size—yet, taking them altogether, we can hardly say too much in their praise. With a constitution which—although not capable of bearing the amount of starvation which stunts the growth and attenuates the forms of their poor relations of the mountain—may still be termed hardy, they possess the qualities of speed and endurance in an astonishing degree, and can carry great weights; they run from 12½ to 13½ hands in height, are clean-legged, with good bone, and very safe. Our Welsh friends will not be offended by our remarking that we think they have somewhat injured their stock in character and appearance by the introduction of Norwegian blood; for though it may have imparted greater endurance and hardiness, it has rendered them slower and more sluggish in spirits, whilst as to colour, the good old-fashioned greys, browns, blacks, and dark chesnuts, are giving way to dun or mouse colour, dingy light chesnuts with white manes and tails, and other mixtures, which much injure their sale.

As to the ponies of North Wales, little can be said in this report, as they are situated at least 100 miles from the seat of the South-Wales exhibition, Cardiff. Neither were it well to specify any particular breeders. Each Welshman would be up in arms in defence of his own hills and ponies, and dare us to prove that they could not, if they chose, rear racehorses on the top of Snow-

don in Carnarvon, or Plinlimmon in Montgomery. But Dame Nature must here be first consulted, and a little reflection will show that altitude and climate govern the peculiarities of the mountain pony.

We noticed one mare pony from the English side of the Channel. This animal had good points, but was by no means a representative of the Exmoor breed.

PIGS.

Boars of a large breed: 9 entries.—In this class were some perfectly-formed animals, exhibited by Mr. Hewer, of Seven Hampton; but they would have been improved by the infusion of a little more quality.

In the sow class was a specimen of the Berkshire breed, belonging to Mr. Edward Bowley, of Cirencester, in which both size and quality were combined.

Both prizes for the pens of three young sows went to Mr. Hewer. The same remark applies to them as to the boar class.

All the prizes for boars and sows of a small breed were carried off by the Rev. G. F. Hodson, of North Petherton. One boar and one sow were very neat, the boar particularly so; but the second-prize animals were evidently cross-bred, and had very inferior bone.

In the pens of the breeding sows there was nothing worthy of notice. The small-breed classes were not equal to those of former exhibitions. There were 19 entries in the three classes.

WELSH CATTLE.

The Principality has been the seat of some of our original breeds of cattle. Howell the Good describes some of the Welsh cattle in the tenth century as being "white with red ears," resembling the wild cattle of Chillingham Castle. These were preserved in the parks of the nobles. The same record mentions also the "dark or brown coloured breed" which now exists, and which is general throughout the Principality. These are of the "middle-horn" class already alluded to. They are stunted in their growth chiefly from the scanty food which their mountain walks produce, but they carry with them many of the characteristics of the Hereford, Devon, and Sussex cattle. Amongst them we have in South Wales the Pembrokes, Glamorgans, Monmouths, &c. The steers of these breeds have long commanded a ready sale in the midland counties, and when fed for the London market are fully appreciated by the butcher.

North Wales, considered as a cattle country, is divided into two districts: the first includes Anglesey, Carnarvon, and Merioneth; the second, Denbigh, Flint, and Montgomery: the latter

being celebrated for its dairy produce, whilst in the former the rearing of cattle is almost exclusively attended to. It is impossible to give correctly the numbers of cattle annually sent from North and South Wales to the English counties. I find that in 1855 22,000, and in 1857 25,000, passed through the Chester station; and we may safely say that an additional 5000 would go by the road. These oxen or runts are principally grazed in Leicestershire, Northamptonshire, and Warwickshire. The small (but best) heifers go to the eastern counties, Kent, &c. Nothing but spirited attention is required to make this branch of agriculture an important and profitable pursuit; all that is needed being that farmers should be more careful in the selection of their breeding stock, and keep their best heifers to breed from instead of selling them into the eastern markets. Like the Scots, they thrive where large English beasts would starve. The Smithfield Club has already recognised them as an established breed, worthy of a place in the Club's prize-sheet; and for the display of these breeds we had four open classes, viz. two for bulls and two for cows and heifers; but (owing evidently to some misunderstanding on the part of the breeders) two animals only—one cow and one heifer—were exhibited, and one of these was an inferior animal. Still it went far to show "what an animal ought not to be," and thus illustrated the fact that there is great room for improvement in the Welsh cattle.

Mr. Watson, of Keillor, Cupar Angus, Scotland, writes me thus—

"I have no doubt that either our West or North Highland cattle might be profitably introduced into the mountainous districts of Wales, and on the lower pastures the polled Angus or Galloway breeds. They are both of fine quality, and rent-paying animals on middling pastures; but perhaps the first step should be to improve the pastures by surface-draining when required, and by burning and liming where the herbage is coarse."

SPECIAL PRIZES.

These prizes were offered by the Mayor of Cardiff (C. E. Williams, Esq.) and confined to the breeders in South Wales and Monmouthshire. The specimens sent consisted of many breeds. In the cow class were the red and white and the brown and white Welsh cow, the Ayrshire, the Hereford, and the Short-horn, together numbering ten entries.

Mr. Reese Keene, of Pencraig, carried off the prize with a brown and white faced cow, *Beauty*. Mr. Logan's red cow, *Stately*, was commended.

The class for steers was not so well filled, there being only three entries, viz. a pair of Welsh steers, a pair of red and white-

faced steers, and a pair (one red and one white) the property of Sir C. Morgan, which received the prize.

EXTRA STOCK.

CATTLE.—Amongst these, the judges selected a short-horn cow, the property of Mr. Entwistle; a short-horn cow of Mr. Logan; a pair of twin short-horn heifers of Sir C. Morgan; and a Hereford heifer of the Tredegar Iron Company. All of these received special prizes.

The pair of heifers exhibited by Sir C. Morgan would have stood well in the short-horn class open for them.

Mr. Logan's cow was the dam of the celebrated fat steer fed by the Duke of Beaufort, that won the gold medal at the Birmingham show in 1856, and the first prize at the French exhibition at Poissy in 1857.

SHEEP.—There were four lots of Welsh sheep shown in the extra stock, but they were not noticed by the judges.

The Leicester ewe exhibited by Mr. Watkins was a good specimen of his Woodfield flock.

Amongst the horses in the extra stock a special prize was deservedly awarded to Mr. J. C. Wall, of Bristol, for his black Welsh pony.

There were also some good pigs.

There is a remarkable fact apparent in the preceding notes upon our Meeting, viz:—

That the country is much indebted to the talent of our early breeders, who, in those days of slow enterprise and small encouragement, propagated from animals that appeared to possess peculiar qualities worthy of cultivation.

Thus, the short-horn tribes have come from the Messrs. Collings' herd; the best North Devons from the late Mr. Francis Quartly; the Leicesters from the late Mr. Bakewell's flock; the South-downs from the late Mr. Ellman.

While it is interesting to notice these incidents, it is no less a matter of encouragement to reflect upon the continued success of the present breeders who possess the direct lines of blood from these early families; as an illustration, Mr. Booth owns the nearest representatives of the Collings' tribe of short-horns; the Messrs. Quartly, of their uncle Mr. F. Quartly's stock; Mr. Sanday, of the Dishley flock; Mr. Webb, of the Glynde flock; and so on: all indicating the importance of the one grand desideratum, purity of blood.

III.—*A Report of Personal Experience on a Farm, upwards of 500 acres, situate at Kilmington, in the County of Somerset.*
By JOSEPH LUSH, of Brewham House, near Bruton.

IN writing a report of my experience, in accordance with the terms proposed by the Bath and West of England Agricultural Society, I am under the necessity of going back to the year 1837. In the autumn of that year I rented a farm, upwards of 500 acres, of the steward of the Earl of Ilchester, of the following description, viz :—

- 30 ac. of dry pasture.
- 66 do. very poor do.
- 51 do. dry arable.
- 52 do. exceedingly poor and worked out arable, in cultivation.
- 60 do. poorer arable, thrown out of cultivation several years.
- 237 do. common, that had not been cultivated in the memory of the oldest man then living, and some had never been turned.
- 5 do. coppice.
- 5 do. waste, by road-sides.

506

The land had been occupied by one family, father and son, for 35 years ; and, on the death of the father, the son gave notice to quit it ; and at that time it was in the following state of cultivation. Of the 51 acres of best arable—

- 11 ac. were wheat stubbles.
- 10 do. barley do.
- 7 do. clover do.
- 3 do. swedes.
- 20 do. fallows.

51

Of the 52 acres of poorer arable—

- 8 ac. wheat stubbles.
- 21 do. oat do.
- 11 do. vetch do.
- 12 do. fallows, which had been turned nearly a year, and left.

52

So that the whole of the farm to have been at that time in the hands of one management, and the cultivation was more or less encum-

The pastures bore very bad crops, and many acres of them produced an abundance of fern.

The stock consisted of dairy cows and heifers of all ages (reared to feed on the common) of no particular breed; the heifers were generally sold with their first calves. The sheep consisted of Down ewes for breeding, and the custom was to sell the wether lambs and draft ewes in the autumn of each year, and to put the ewe lambs out to keep for the winter.

The land was generally admitted to be the worst as a farm in that part of the country. It is a mixture of gravel, clay, and sand, on a subsoil of stone, flint, and clay, with a bed of green sand below: it is several hundred feet above the level of the sea, and the climate bad, crops coming to harvest later than on most other farms even in the immediate neighbourhood.

Although I was born and lived 30 years in the middle of the farm, I had the opinion of two men eminent as farmers before I took it. One of them was, and still is, a land-valuer and appraiser of much experience. Their valuations, made at different times, were nearly the same—about 50*l.* per annum below the price asked for it. They advised me not to take it, and predicted my speedy failure if I did. They considered a considerable quantity of the land entirely useless.

With this information and advice I went to the steward, and, as I could not get any abatement, I agreed to take the farm, and was promised a lease of 14 years.

I bought the crop of 1837 at a valuation. The wheat was estimated at 20 bushels per acre, the oats at 23 bushels per acre, and the barley at 22 bushels per acre. In each case the estimate was rather above the quantity realised.

I determined to begin with spirit as well as with caution, and obtained, as often as I could, the opinions of my farming friends; but found that my own experience, on a few acres I had previously farmed, was generally of the most service to me.

The fences were exceedingly bad, even the boundaries; the fields were very irregular in shape and size, but the whole was tolerably level.

I commenced grubbing fences and old hedge-rows on the best arable, and increased the available measure of that part at least two acres; at the same time I began grubbing furze, and digging a piece of about 30 acres of the best of the common, employing every man I could get, and expended nearly 300*l.* the first winter, besides my ordinary wages. I tried various ways of getting this piece into cultivation; some was dug with the spade, but, in consequence of the furze, fern, and heath-roots, was turned over very coarsely; some was mattocked four inches deep; and some was pared and the turf moved off, and then mattocked and the turf

moved back, and left on the top for burning. The whole was rather roughly performed, and, when finished, was sown to oats, which were, at a great expense with harrows and hoes, covered, and came up remarkably well, and looked all that could be wished for ten days or a fortnight, when they gradually became blue in colour and stunted in growth. It was a wet feeding season, and they rallied a little, and produced 15 bushels per acre, which was not very encouraging. I also employed a double strength of horses and oxen in cleaning the land found in cultivation, and, having previously used bones and other artificial manures on a very small scale with great success, of course, I applied bones on this land for all root crops, which answered well.

My stock consisted of a breeding flock of Down ewes, and in this instance I continued the custom of my predecessors of selling my draft ewes and wether lambs in the autumn of each year, and of putting my ewe lambs out to keep for the winter. The latter part of the plan I very soon discontinued, finding it more profitable to keep them on the farm, even if I had to buy food for them. My cattle were Herefords. I had been for some years previously an admirer and a keeper of that breed, and had a few good animals, which I increased as fast as I could, till I had a full stock (consisting of dairy or breeding cows, oxen, steers, heifers, and bulls). I reared all my calves, making the dairy business a secondary consideration. In 1841 I gave 50*l.* for a bull-calf at Hereford fair, which sum was the best laid out of any money I ever expended in stock. After I purchased him, on the same day he obtained the first prize at the show of bulls under 1 year old; 22 competed. My plan was criticised; but, after making many careful calculations, I was convinced that it was more profitable than letting a dairy. I did not fat many beasts (in that, perhaps, I erred), but sold most as barren cows, bulls, and oxen, which I generally worked two or three years. I cannot make any comparison of my stock with my predecessors, because I always occupied some pasture land, in addition to the farm they had.

In order to expedite the clearing of the common, I offered any person as much as he wished to cultivate and crop, with potatoes, for two years, gratis, upon condition that, in case I chose to take it at the end of one year, I was to pay 2*l.* per acre for it. This plan answered my purpose well, and I had a considerable quantity cleaned in this way. The best oats I ever grew, indeed the only crop I ever grew profitably on the new land without lime, was after one crop of potatoes. In 1845 the potato disease appeared, and deprived me of this mode of cleansing.

I continued to employ all the men I could get in each winter,

and at other times, when labour was scarce, digging, mattocking, and paring and burning, the common land. I found that the paring and burning was the quickest way of cleansing. Some men could not use the breast-plough, and some disliked the spade. I had one man in particular, with only one arm, who worked at mattocking for twelve winters in succession, and sometimes in summer also. From the beginning to the end he never left my service, except for a temporary purpose, so that I could not confine myself to paring and burning. I did not value the ashes much, and was apprehensive that burning would deteriorate the land; but it did not do the harm I expected, as subsequent experience has proved; besides, some of it could not be pared. Where the strongest furze grew, it could only be mattocked, which was done roughly at 3*d.* per perch, or 2*l.* per acre. The parts less encumbered with furze were pared with difficulty. All the land was covered with fern, and much of it with furze and heath. Paring and mattocking, to the depth of 3 inches, leaving the turf on the top to be burnt, cost 6*d.* per perch, or 4*l.* per acre. Burning the turf was so difficult, in consequence of the sand in it, that I could not get the men to undertake it by measure, and, strange to say, it cost me, in some instances, as much as 4*l.* per acre, including throwing the ashes: the surface being very uneven, it could not be cut thin, and, of course, the burning was more difficult. The expenses attending the bringing the worst part into a state to plough properly were over 10*l.* per acre. One piece, less encumbered than the rest, I ploughed, then rolled it, and allowed it to remain nearly a year, and then found it impossible to cut it across with the same implement, and was obliged to give 1*l.* per acre to have it cut in pieces with sharp mattocks. It took about two years to rot the turf.

I will state here how I was misled by a good Wiltshire farmer. I had a piece pared and burnt, and an abundance of ashes produced. I intended to have spread them, and to have drilled a small quantity of bones with the turnip-seed, but he entreated me not to waste the bones, as he would guarantee a first-rate crop of turnips with the ashes alone, if drilled with the seed. I tried his plan on part of the field, and bones on the other part, and found the bones, 12 bushels per acre, produce a very good crop; the ashes alone (except where the fires were) produced nothing—absolutely nothing. I invited some of my neighbours to see the effect of bones, as none had been used in the parish at that time but by myself. They ridiculed the idea that 12 bushels of bones to an acre had made the difference, and for many years afterwards some looked at my crops with as little belief as ever

in the virtue of bones; but now the same parties use a little artificial manure occasionally. Eighteen or twenty years have worked a change.

After taking off the first crop of oats on the first piece of 30 acres, I ploughed it, and found much of the turf as sound as ever, and the fern-roots so thick that I could scarcely work the drags on it. After picking up and burning hundreds of loads of roots, principally of fern, I sowed it to oats the second time, and had a better crop than the first—21 bushels per acre. I was now convinced that nothing could be done with it profitably without lime or some artificial manure. Wherever I used lime for corn and bones for roots, it answered admirably, so that I was encouraged to hope that it would ultimately pay. I used a London-made manure one or two years before, and now tried it again, but was not satisfied with it. It was called "Carbonated Humus."

As the practice adopted with the first piece was continued with very little variation till the whole was cleared, I will state more particularly my management of it. After the second crop of oats was off, I fallowed it, and commenced by liming one part at the rate of 30 quarters per acre: the other part I prepared for swedes, which I drilled with bones, about two quarters per acre. They were tolerably good, and were fed on the land, which was sown the following year (after being well manured from the yards) with vetches, rape, and turnips. Most of the limed part was also sown to rape and turnips; and in the autumn the part that had been limed and sown to green crops, and had been well trodden with sheep, was sown to wheat, and produced a good crop. The part limed, and not sown to a green crop, was very light and unfit for wheat; I therefore sowed it to rye, which answered remarkably well, and from that time till the whole was brought into a regular course, I have grown rye on part of my wheat-field, if found to be loose and light, which was generally the case on the parts which had not grown turnips or rape. I have always found rape after swedes the best preparation for wheat, and in that way I have grown upwards of 40 bushels per acre in a very good season. In the year 1854, I grew, on 109 acres and 12 perches, 1046 sacks and 2 bushels. The crop of 1837, which I bought, and the two first crops of my own growth, did not average 120 sacks a year. The crop of 1837 had a great quantity of smut in it, and I was told that I should always have smut in my crops; but for the whole twenty years I have not seen as many smut-balls. I always dress my seed wheat with one pound of blue vitriol in four gallons of water to four bushels of wheat. I invariably sow or drill my wheat and other corn on ridges 33 feet wide; whereas my predecessor sowed on ridges 8 feet wide, by which a loss was certain of some bushels per acre. Some of my neigh-

hours adhere to the same plan now on land quite as dry as mine.

As I began to grow more straw and of better quality, a question, often before discussed, became important to me, *i. e.* which was the most profitable way of using it for food. A friend of mine, a most intelligent man, a large and good farmer, with whom a mutual feeling of interest had long existed as to the result of our farming operations, often called my attention to the matter, and we found that we could not keep our cattle in condition through the winter on straw alone: they lost in the winter the gain of the previous summer. My friend tried brewers' grains, mixed with cut straw; they were very palatable to the cattle, but the supply was uncertain, which made it inconvenient. We came to the conclusion that swedes would be the best thing to depend upon, if they could be reduced to a state that, when mixed with chaff, the cattle could not separate it. An apple-mill was tried, and used by my friend some time, but was found unsuitable. Surely "necessity is the mother of invention." Mr. Moody, whose name is now familiar throughout England, was one of our friends, and often joined us in the evening; and, being of an ingenious turn of mind and equally interested in the cause, we advised him (not being mechanical ourselves) to make something that would answer the end we had in view. He promised to try, and in a short time produced a cumbrous, clumsy machine, made principally of wood, with which swedes could be crushed with difficulty, and this was the first step towards the completing of "Moody's Cutters." From time to time improvements were made till he produced a perfect machine for horse-power, which I use to the present time, and which I think is not equalled by any for crushing swedes in order to mix them with inferior food.

About this time also (1839) another practice was commenced by my neighbour, and then by myself, of mixing green crops with straw for cattle; and we have continued the plan to the present time, as occasion required, although some gentlemen-farmers, in their public speeches, many years afterwards, took the credit to themselves of introducing the practice.

In 1841, I went from the Liverpool Agricultural Meeting to Scotland, in company with two first-rate Wiltshire farmers. We had heard much of the excellence of the farming there, and of our own ignorance; we determined to see for ourselves. We were well introduced, and spent a few days with some eminent agriculturists very agreeably. Perhaps we ought to have remained longer; but during our stay we saw nothing worth our imitation, except their turnip-culture and the threshing by steam. We saw some very bad management, particularly in haymaking. As to rearing and feeding store-cattle and the management of sheep (an

important matter here), they were certainly a long way behind us, in our opinion. The difference in cleaning and thinning turnips attracted my attention. The practice in Wiltshire was to clean principally with the hand-hoe, about 9 or 10 inches long, made at an acute angle with the handle, which was about 3 feet long, so that the hoer was obliged to stoop, and was thus enabled to throw his whole weight and strength on the hoe to cut the soil deeply. I have known a good farmer refuse to employ men till they reduced the length of their hoe-handles, making it an indispensable condition; but in Scotland I found the hoes about 7 inches long, forming a right angle with the handle, which was at least 4½ feet long: both kinds were suitable for the different modes of culture. In Wiltshire, without the horse-hoe, all the land required to be cut, and it was generally performed by our best men; whereas, in Scotland, all the cleaning was done by horse-hoes, the hand-hoes, as above described, were used by females for thinning only, standing almost upright in their work, and the hoe was adapted for thinning the plant by pushing from as well as by pulling towards the person using it. I had some hoes made of this pattern, and having, since that time, managed many hundred acres on both plans, am of opinion that I can grow the greatest weight of roots, and best clean the land in all seasons, on the Scotch system.

In 1842, I used "Daniel's patent manure," 30 bushels per acre, in the manner directed by the patentee, without seeing any effect from its use; and this year I experienced a greater advantage from the use of bones than I had at any previous time. I prepared a piece of the new land, as well as I could, for swedes, and drilled a little more than 16 bushels of bones per acre with the seed; and, in order to demonstrate more fully to the unbelieving the benefit of bones, I ordered a manure-pipe to be stopped from end to end of the piece on several parts of the field, and allowed only the seed to drop, and the difference was truly wonderful. Where no bones fell, the swedes never attained the size of a nut, and where the proper portion of bones was deposited, they were generally from 16 to 21 inches in circumference; and even then some would not admit the good of bones. One person, farming his own estate of about 700 acres in Wiltshire, held me up to ridicule in a public company for stating the above facts, and declared that no one should ever convince him that 16 bushels of bones on an acre of land could do any good to a crop of turnips. Nine years afterwards, I saw two of that person's waggons leaving his market-town with full loads of artificial manure. On inquiry, I found that he had first used it the year previously.

Up to 1844, I had not made rent or taxes, having expended all in improvements; but this year I had a great breadth of corn,

and the summer was fine, and the crops yielded well. I had previously limed upwards of 100 acres, at 30 qrs. per acre, besides using a great quantity on the pastures, which I generally mixed with road-scrappings, of all which I now found the advantage. I had used lime from eleven different kilns, which was burnt from almost as many different kinds of stone, but could not discover much difference in the results. My plan of liming the arable land has always been to put it on fallow after it has been once harrowed, and generally at the rate of 30 qrs. per acre. If applied when the fallow is rough, a portion, more or less, according to its state, will be lost. When properly slacked, I spread it evenly, and immediately harrow it two or three ways, so that it may be thoroughly incorporated with the soil. It is an expensive dressing, and should not be carelessly applied.

I tried carbonate of soda for wheat, with bad results. It increased the bulk of straw, but retarded its ripening, and the corn was blighted, although it was in the middle of a field otherwise free from blight.

I tried subsoiling on some of my best land previously to sowing it with spring-beans, but it was useless; and I have never since been able to discover any difference in any crop that I have grown on it. I had previously tried beans, without ever getting anything like a good crop.

I have grown winter beans with rather better success.

Peas of several different kinds I have tried, and given up as unsuitable for the land and climate.

I cannot grow barley to any advantage. I may obtain a bulk of straw, but the grain is always of very bad quality.

I dislike thin crops of corn, therefore have never tried thin sowing, but have witnessed the results. A gentleman came to an estate near me from a much better climate and land, and condemned very much my practice of thick sowing. He tried the opposite system by dibbling a small piece to wheat at the rate of 1 bushel per acre, and also by sowing three pieces of the same size to oats:—1st, 4 bushels per acre; 2nd, 6 bushels; 3rd (much against his will), 8 bushels per acre. The result was *no wheat*, the exact yield of oats I never ascertained; but the bailiff told me the piece sown with 8 bushels per acre produced about as much as both the other two pieces, which, from my own frequent observation, I believe was near the truth. There is another evil attending thin sowing on my land; for I have always found that, unless I take full possession of the land with the crop I want, I am sure to have an abundance of things that I do not want. When corn is drilled, of course, the hoe may prevent the intrusion, but only to a certain extent; for the hoeing cannot be continued long enough to do so entirely. I have proved many

times that I can grow more corn per acre (particularly of wheat) by sowing than by drilling.

My improvements went on rather slowly for two or three years, as I could not obtain the promised lease. The steward of whom I took the farm died, and soon afterwards his successor followed, so that I did not feel justified in going so far as a yearly tenant as I otherwise should have done; but, fortunately, my noble landlord called on me, rode over the farm, and was so well pleased that he told me at once that I should not be any longer disappointed of a lease. I then with fresh spirit took out all the remaining fences that I could on the arable land, and reclaimed the whole, making a total of 403 acres arable. I have one piece of 280 acres, without a fence, cultivated in three equal portions. All the land, as it came into a ploughable state, was managed on a five-field course, as follows:—wheat; swedes, grown with artificial manure; oats; clover; vetches, rape, and turnips. All my yard-manure was applied, after the clover was mown, for vetches, rape, and turnips, on the field intended to be sown the following autumn to wheat. This system I found inconvenient in one respect, which was that it was not economical to get my swedes fed off sufficiently early to sow oats in proper season, and barley did not pay me. I tried white oats, but they were always of a bad colour. In 1850, I altered my system to another five-field course, namely—wheat; oats; clover; vetches and swedes; vetches, rape, and turnips. I have now changed to a four-field course,—taking wheat; oats, half sown to grass; clover and swedes; vetches, rape, and turnips. By this plan, I sow clover but once in eight years, by which I hope to secure a better crop. I have tried Italian rye-grass several times, first as long ago as 1843, but I have never had a thick good crop. I do not much like it (perhaps I have not sown a good and clean sample), but have found a little very useful as early feed on several occasions. Hitherto (1852) I had hired a steam-engine for threshing for some years, having been the first to introduce one in the parish: but now I bought one, and a boulding-machine, of Mr. Cambridge, which answered well; and although it was a portable engine, I built a high chimney and a house for it, which I consider a great advantage, as I can use it for any purpose in any weather, without any risk, and with less fuel. In about four years, the boulder was much the worse for wear, but the engine (which was of 5-horse power) was as good as ever; and, to keep pace with the times, I exchanged with Mr. Cambridge for a combined thresher and an 8-horse power engine, which, I think, taking it in all its points, is as good as anything of the kind I have seen.

Most, I suppose, know that where lime answers well, chalk or

malm will also do good ; but few persons, I think, have witnessed such extraordinary results as I am about to relate from the use of the latter. In 1841, I wished to try malm on a piece of land of 26 acres, which was covered with very short heath and fern, with a little grass of the very coarsest kind. I agreed with a neighbouring farmer to allow me to dig some on his farm at 3*d.* per load (I have nothing of the kind on my land). I had about a mile to haul it, and I put about 35 loads per acre, at a cost of about 5*l.* After I covered about 6 acres of the worst part of the field, a circumstance occurred that prevented my continuing it ; the next year it began to alter the appearance of the land, and in two or three years after, if a flock of sheep were turned into the opposite end of the field, in a few minutes three-fourths of them would be on the 6 acre malmed. In 1847, being six years after it was done, I decided on digging the whole piece, and I began with the malmed part, which turned out mellow and nice ; but when the men, about 20, came on to dig on the other part, it was of quite a different colour, and such a sour and most unpleasant smell arose from it, that I could perceive it a quarter of a mile off. In fact, a gentleman walking with me at about that distance could not imagine from whence the smell came, and had to be convinced by going to the spot. The digging was taken at 2½*d.* per lug, but, when the malmed part was finished, I was obliged to advance the price to 3*d.* per lug. Some weeks after the whole field was turned, the malmed piece, and 3 acres adjoining it, was sown to oats ; the other part of the field was drilled to swedes with dissolved bones. At harvest the oats on the malm part were 5 feet high, and produced 63 bushels per acre ; and on the adjoining 3 acres, 1½ feet high, producing 15 bushels per acre. The swedes were not very good ; I fed them on the same, and then ploughed the whole field, and found the turf but little rotted on the part not malmed. At spring I sowed it all to oats, and the result was 59 bushels on the malm parts, and 25 bushels per acre on the remainder of the field ; every drill of bones used the previous season for seeds could be easily seen by the difference in the oats. I then folded the whole field equally over with 2000 sheep per acre, and sowed oats again—this was the third time on 9 acres, and the second time on the other part ; this crop produced 67 bushels per acre on the malmed, and 41 bushels on the other parts, showing the extraordinary difference in the average of three crops of 63 bushels against 27 bushels per acre ; so that, if I had continued the malm over the whole field at first, I should have had on the three crops 1324 bushels of oats more than I had, which, at 2*s.* 6*d.* per bushel, would be 155*l.* 10*s.* I then considered the field deserved better treatment ; so I fallowed it, and limed the part not malmed with upwards of 30 qrs. per acre,

brought it into a regular course with my other land, and have had good crops of all kinds on it since. For at least seven years after it was dug, a person walking across it blindfolded could tell the malm part by the difference of feeling to his feet.

I have tried salt with lime, which answered well; and also salt alone on some occasions has been very beneficial, principally in preserving vetches from the slugs. I have tried it for preventing "fingers and toes" in turnips (which my land is very subject to), but I have found lime the best preventive for that disease.

I have found genuine guano very good for a top-dressing for corn, and Proctor's wheat manure good for wheat; but prefer doing all that is necessary to secure, or to expect a crop of wheat, in the summer previous to sowing it. I have found soot, the genuine article, exceedingly useful where the wire-worm or hares and rabbits have injured my wheat. With regard to soot, I have been sadly imposed upon—in the country by adulteration, and in the large towns by short measure.

I have tried a great many sorts of turnip manure with various results, and have dissolved bones with vitriol on the premises for several years, which proved economical; but now prefer using bones alone chiefly, and some dissolved without vitriol. I have also used the liquid manure drill with great advantage, and was one of the first that used it.

I have sown sanfoin many times in small patches in my lent corn, but never saw any come to the scythe.

I have scarcely ever grown any good winter vetches when sown in the autumn; but have grown them very good when sown in February, and spring ones as good as I have ever seen anywhere.

From the commencement in 1837 to 1853, I continued the system of breeding cattle, regarding quality rather than milk, but not to the extent of the Hereford breeders. I merely kept my calves on milk as long as was necessary (not the whole summer), and made cheese afterwards; but in 1853 circumstances induced me to let my cows, which I have continued to the present time; and although my present dairyman makes cheese of the very best quality, and can, I presume, make the most of the milk, I do not consider it so profitable, on the whole, as my former system. When I reared all my calves, I could keep a greater number of cattle; and through the winter I invariably fed them on ground swedes and chaff, except when swedes were short, then cake was used instead, and sometimes boiled peas were substituted, which are an excellent food to mix with chaff. My stock were all of good quality, and my worked oxen, barren cows, and bulls, always commanded good prices.

With regard to my grass land, I mow it and feed it alternately,

and put on it as much compost as I can from time to time get together.

None of my land requires draining.

I have no orchard. I cannot grow apple-trees in my garden by any means that have yet been tried.

I cannot say much of the manufacture of dung, and I think the less that is done in that way in the yards the better. I endeavour to mix the different qualities as well as I can, and get it into the soil with as little delay as possible. From the time I finish wheat sowing, which is in November, to the time I begin sowing in the following October, I take every opportunity of clearing the yards, and conveying it to the fields for clover, vetches, rape, and turnips as a preparation for wheat, and I particularly desire that not an atom or drop of the excrements of any animal be allowed to drop in the yards or houses, without straw being under them to receive and absorb it.

As to the treatment of labourers, I think I stand tolerably well with them, as I seldom change. I act on the commercial principle of buying in the cheapest market, but do not consider the lowest price always the cheapest. I hire mostly by the week, but my reaping, mowing, hedging, and hoeing is done by measure, and some other work also, as occasion requires. I have for upwards of twenty-five years paid my labourers weekly on Friday evening, in cash separately, so that none should have an excuse to go to the ale-house or shop for change; and although the whole time I had business transactions with the landlord of the inn in the village, and received large sums in each year from him, I never sent a labourer there for wages. During the whole time of my improvements, I superintended nearly always on foot, and assisted in every operation that took place on the farm, and measured the whole of my piece-work (with very few exceptions) myself, and very seldom had a complaint of any mistake; in fact, the men generally preferred my measuring their work, as they then saved their moiety of the expense; and although I have had as many, on one or two occasions, as one hundred persons in my employ at one time, I have never had a magistrate's summons for any one in my service, nor was I ever summoned by one of them on any matter whatever.

If it ever happened that I did not pay my labourers on the Friday, or that I had not change to pay every one separately, it was an exceptional case by no means of frequent occurrence. When they are thus treated, I consider them entitled, on many occasions, to my sympathy and assistance.

Some of my labourers take wheat, but it is at their own request; they were never asked to buy it, nor anything else, the produce of the farm.

My wages have been generally, even from the first year, about 400*l.* a year more than my predecessors.

As I stated at the beginning, the average of the different crops at the time I entered on the farm in 1837—I place it again here in juxta-position with the state in which it was in 1857.

<i>State in October, 1837.</i>		<i>State in October, 1857.</i>	
18 acres	wheat stubbles.	93 acres	wheat stubbles.
32 "	oat and barley stubbles.	108 "	oat and barley stubbles.
7 "	clover stubbles.	100 {	50 acres clover stubbles.
3 "	swedes.	50 "	swedes.
11 "	vetch stubbles.	102 acres	vetch stubble, turnips,
32 "	fallows.		rape, and fallows.
300 "	barren.	—	
403		403	

The weather in summer is seldom too dry for my land, and the difference in the yield of corn in a dry season and a wet one is often much more than the value of the rent of the farm. Although I had an excellent crop, as before stated, in 1854, in the very next year I only grew 560 sacks 3 bushels, on 77 acres 3 roods 16 poles.

The difference also in my losses of sheep-stock (which is generally great) in a hard winter and a mild one, is very observable. My stock is about 470 ewes and 220 tegs, with a few odd ones to make 700, and in the summer a few over 400 lambs. I have always found it a great advantage to dip my sheep in a solution of arsenic, black soap, &c., which is done in the autumn of each year. I keep them continually on the arable land, except at the lambing season, when the ewes are brought into a yard by night. My loss has varied, of full grown sheep, from 4 to 10 per cent.

Below I have shown the effects of the various seasons in ripening corn and harvesting for the last twenty years. In one instance, 1846, I began cutting corn as early as July 27th, and in the year previous, September 1st, showing a difference of 1 month and 8 days; and finished harvest, in the first case, August 25th, and, in the other case, October 15th, showing a difference of 1 month and 23 days.

Commenced cutting corn.		Harvest finished.		Commenced cutting corn.		Harvest finished.	
1838, August	25 ..	Sept. 18		1848, August	11 ..	Sept. 13	
1839, "	26 ..	Oct. 1		1849, "	15 ..	" 15	
1840, "	20 ..	Sept. 15		1850, "	16 ..	" 7	
1841, "	21 ..	Oct. 20		1851, "	14 ..	" 10	
1842, "	15 ..	Sept. 12		1852, "	13 ..	" 11	
1843, "	24 ..	" 14		1853, "	29 ..	Oct. 8	
1844, "	5 ..	August 31		1854, "	21 ..	Sept. 15	
1845, Sept.	1 ..	Oct. 15		1855, "	27 ..	" 27	
1846, July	27 ..	August 25		1856, "	23 ..	" 9	
1847, August	18 ..	Sept. 2		1857, "	10 ..	August 31	

IV.—*The Sheep of the West of England.* By HENRY TANNER, Professor of Agriculture and Rural Economy, Queen's College, Birmingham.

It will be desirable in this Report to embody within the district described as the West of England the counties of Cornwall, Devon, Somerset, Gloucester, Wilts, and Dorset; for, apart from the fact that it appears to be the district which the term includes, we have varieties of sheep and management in the two former counties which well merit our attention. I therefore proceed to notice

THE NATIVE BREEDS.

Cornwall.—The earliest information we have of the original Cornish sheep describes them in very unfavourable terms, as having very small bodies, and wool so coarse as to exempt it from the customary duty on wool. It was known as Cornish hair. Anderson, in his 'Origin of Commerce,' published in 1762, gives the following as the prices of wool at that time:—

	£.	s.	d.	
Shropshire Wool	9	6	8	per sack.
Leicester and Hereford	8	0	0	„
Cornish wool	2	13	4	„

At the present time the representatives of the original breed are very seldom met with, and then in an improved condition; but these are to be found on the open moors of the west and north-west of the county. They are exceedingly hardy; but the length of the neck and legs, the deficiency of barrel, and the rump, are peculiarities which detract much from their value and appearance. They are kept for four or five years, and then, when fattened upon enclosed lands, weigh from 14 to 16 lbs. per quarter. The meat, from the age and the wild character of the sheep, is exceedingly good, and much sought after.

These have been the foundation from which most of the Cornish sheep have sprung. Rams of various breeds have been introduced, and have improved the general character of the flocks of the county. Some of these rams have been bred in the county, others have been brought from their native districts. The Cotswold, South Down, and Leicester flocks, have all contributed from time to time to their improvement; but the greatest benefit has been derived from the Leicester blood. The quality of the fleece has received much attention in Cornwall, and these weigh from 7 to 10 lbs. in the yolk, which is equal to from 5 to 7½ lbs. of washed wool.

Devon.—According to early accounts the sheep of this county

partake in some measure of the Cornish character. There seems to have been more variety amongst them; and at least three distinct breeds appear to have been kept up in different parts of this extensive county. This has resulted from local peculiarities, and not from any special care on the part of the Devonians. These breeds are known as the Bampton Nott, the South Ham Nott, and the Dartmoor sheep.

The Bampton sheep has long been in favour. Vancouver, in 1808,* speaks of them as producing a profitable class of sheep, which "at 20 months old weighed 22 lbs. per quarter, and sheared $6\frac{1}{4}$ lbs. of wool to the fleece. The same sheep, well wintered and kept for another twelve months, will average 28 lbs. per quarter, and yield 8 lbs. of unwashed wool to the fleece." Another writer says:—"They are the best breed in Devonshire, and have existed in the neighbourhood of Bampton from time immemorial. A fat ewe of that breed rises to 20 lbs. per quarter on an average, and wethers to 30 and 35 lbs. per quarter at 2 years old. They are white-faced, the best breed living more like Leicesters than any other, but larger boned and longer in the legs and body, yet not so long as the Wiltshires, by which they have been crossed, nor so broad-backed as the Leicesters."† Such was the original character of this breed. There are many which are sold as Bampton sheep which have no kindred with the original Bamptons. The true Bamptons are in comparatively few hands resident in the district. A large number of sheep, which are simply mongrel Leicesters, are driven to Bampton fairs for sale under this name. The greater part of the true Bampton sheep have been crossed with Leicester blood,—so much so, indeed, that I doubt if there be a flock of the original Bamptons which has not got some Leicester blood in it. Many breeders have so far introduced the Leicester blood that now their flocks may be safely described as $\frac{3}{4}$ Leicester and $\frac{1}{4}$ Bampton. The Bamptons being prolific and hardy, even in this proportion, give a very desirable degree of hardihood and constitution which makes them much sought after on this account. The improved Bamptons, therefore, may be looked upon as possessing the feeding character of the Leicester sheep with much of the hardy constitution of the Bampton. In this way the peculiar weakness of the Leicester is overcome, and a more serviceable sheep is produced, coming to maturity much earlier, and fattening more rapidly than the original Bamptons. At 16 or 18 months' old these wethers will now weigh 22 to 24 lbs. per quarter, and each give 7 or 8 lbs. of good washed wool. But with this the extended turnip husbandry, &c., has had much to do.

* Vancouver's 'Agriculture of Devon,' p. 342,

† 'Annals of Agriculture,' vol. xvii. p. 300.

The South Ham Nott is found in the district from which it takes its name, which constitutes a large portion of the fertile land of South Devon. The origin of this breed is somewhat uncertain. They are an inferior description of sheep, and ill-shaped, carrying heavy but coarse fleeces, and coming to a great weight. Their faces and legs are somewhat of a chocolate colour, indicating some kindred to the Down. These sheep are daily becoming less common, as the introduction of Leicester blood is so manifestly productive of good, that, with very few exceptions, we have cross-bred flocks from these ewes by Leicester rams. This has been accompanied with a decided improvement in form, greater disposition for fattening, a better fleece—but of less weight, and they are ready for market earlier. Generally speaking, these sheep were kept to the age of 28 or 30 months, when they would weigh 24 lbs. per quarter; now they reach this weight in 18 or 20 months. The Leicester blood has become thoroughly engrafted on these sheep, and they now approach the character of the Leicester in a greater or less degree. These mixed South Hams and Leicester sheep extend through the south of Devon, and run into Cornwall. They are well suited to the rank herbage of these parts, and with ordinary farmers answer even better than pure-bred Leicesters.

The Dartmoor sheep is another of the Devonshire breeds. It is a true mountain-sheep in its unimproved condition. The district giving rise to this breed of sheep is an extensive and elevated table-land in the southern part of Devon. Here these sheep range at perfect liberty throughout the year, providing themselves with such food and shelter as will enable them to survive the winter months, and thriving during the few summer months on the natural yet for a short time luxuriant herbage which abounds. In this manner they have an uncertain and precarious living through the winter months, during which many perish; but in the summer they rally again for another period of semi-starvation. It is only reasonable to anticipate that with such treatment none but the unimproved and almost wild breed of sheep can answer, and such is the case. The Dartmoor sheep, therefore, admit of little improvement so long as such a system is carried out. The Leicester, Southdown, Cheviot, and Cotswold blood have been introduced; but whatever improvement has resulted has not been perpetuated, except in a few solitary instances. The Dartmoor sheep is therefore commonly found in its primitive state upon and around the moor.

These sheep may be described as exceedingly nimble and active, small in size, prolific, good nurses, and when fattened they yield some of the best mutton obtainable. The wethers are generally fattened, when 4 or 5 years' old, by the farmers around

the moor, who put them upon turnips, and then they rapidly become fat enough for the London market, to which a large proportion is sent. At this age they will probably weigh 14 lbs. a quarter. When more attention is given to these sheep they produce stock of superior quality. The use of the Leicester or improved South Hams ram with these ewes on cultivated land has had a surprising influence upon the produce. When Mr. Fowler, of Prince Hall, was breeding sheep at his farm on Dartmoor, he tried the Cheviot and Cotswold against the local sheep. He selected 40 Dartmoor ewes, and for these he used an improved South Hams ram. Besides these, 40 Cheviot ewes were put to a Cotswold ram. They were equally prolific, and excellent nurses. The 40 ewes in each case produced 71 lambs. As the lambs approached maturity (say when 16 months old), the mixed Cheviot and Cotswold were worth from 5s. to 8s. each more than the others. The Dartmoor cross, however, gave 2 lbs. more wool, which reduced the difference in amount. This, however, shows how far this wild and unimproved breed approaches superior and well-bred sheep when crossed with a *good* ram. It proves the Dartmoor sheep to have valuable properties which adapt them for the open moor; and, if well dealt with, they form a valuable class of sheep as a basis for more general use upon the moderately improved lands.

Somersetshire.—The Exmoor sheep come prominently under notice in this county, and originally they were in habit somewhat similar to the Dartmoors. The Exmoor sheep is a horned sheep with a white face, and peculiar tuft of wool upon the brow; the fleece also grows remarkably close to the face or cheeks, and not unfrequently envelopes the whole features, save the nose. It has a remarkable rotundity of form, and stands upon short yet open legs. Much care has been given to the improvement of the Exmoors, and consequently we find many valuable sheep amongst them. These combine a hardy constitution with symmetry and aptitude for fattening. These remarks are applicable to the flocks belonging to the breeders living near the Exmoor range of hills—such as Messrs. John and James Quartly, Messrs. Halse, John Tapp, James Merson,* Messrs. Passmore, Messrs. Shapland, and Richard Stranger. Earl Fortescue and Sir Thos. D. Acland also keep flocks of excellent quality. Mr. Robert Smith, residing as he does upon the moor, has watched their indigenous and cultivated properties to some extent, and established a class of animals which combine with fair feeding qualities the essentials of a round yet robust hardy form of carcase upon short

* Mr. Merson was the breeder of the very beautiful Exmoor sheep exhibited by him at the Cardiff meeting.—R. S.

legs, with thick-set coats of wool, so as to resist their enemy—the winter winds and storms. There are a few others who have given this valuable breed the opportunity of developing their hidden worth. But, alas! it may be said of many flocks that they are little better than the Dartmoor sheep, and scarcely any more care appears to be given to them. It is now more customary than it used to be to cultivate a piece of turnips for them, but a very negligent system is still carried out by the old hill-farmers. It is needless to say such remarks do not apply to what may be termed Exmoor proper, which is the property of Fred. Winn Knight, Esq., M.P.; but it is rather on the unenclosed moors which skirt Exmoor that the Exmoor breed is so much neglected. The usual mode of dealing with the Exmoors is to lamb the ewes about the middle of February, but the beginning of March is quite soon enough. The lambs are weaned when about 3 to 4 months old. The wethers run on the moor until they are from 3 to 6 years old, the fleece and wool being the guide when they should be drafted; they are then taken away, and wintered on turnips. They weigh from 14 to 16 lbs. per quarter, according as they are finished off. The Exmoor mutton always commands the top market-price. The ewes are generally culled out by these men as they lose their teeth, rather than by any other rule. The best breeders select their ewes in ages. Nothing can show the advantages of an improved system of sheep management more than a comparison of the uncultivated Exmoors with others from the well-bred flocks. In one case we have sheep possessing all the requisites for speed and roughing it, whilst the latter are as docile, and have as large a weight of meat within a given space, as any animal, and are closer to the ground than any other breed of sheep.

The sheep which range over the open moors have in general a very primitive mode of management. The ewes receive some little attention during their lambing, and, with this exception, nature does far more for them than man. They are gathered for culling and shearing about the middle of June. The wethers which are to be fattened and the ewes which have bad mouths are separated, and the remainder are again turned on the hills. About the middle of September the rams are turned out with the entire flock of ewes, in the proportion of about 1 ram to 60 or 80 ewes. As these run in common with others upon the open hills, they frequently mix with the neighbouring flocks, in which there may by chance be even a worse ram, worth say some 20s. to 30s. to the butcher: such is the yet primitive state of these flocks and flock-masters. The best breeders keep in their ewes at this season, and select them for each ram, as also feed them better during the winter months; and in this way young Exmoor

wethers of 20 lbs. per quarter have been obtained at 18 months old! Some breeders adopt the older practice of turning their wethers "to hill" for the summer months, and winter them on the coarse grasses upon the farm. At the age of 3 years these make sumptuous sheep of their order; but a considerable number of Exmoor sheep are sent to be fattened on the Bridgwater level, where they attain a considerable weight. Other breeds of sheep are met with in this county, such as the Dorsets, Cotswolds, Leicesters, and Downs; but they will be noticed each in their place.

Dorsetshire.—The breed of sheep, which especially belongs to this county, is distinguished as the Dorset sheep. They are somewhat like well-bred Exmoors; but being a more inland sheep, they are larger and more fully developed. They also carry horns, and the rams certainly vie with the Exmoors for beauty in this respect. As they become aged, the curves of the horns give to the rams of both these breeds a very handsome appearance, and when used in conflict they are extremely dangerous. This is more rare among the Dorsets than the Exmoors; but with these the engagements are sometimes very desperate. The Dorset ewe is also a handsome sheep,—the features are white and rather elongated—the chest is well developed, the shoulder is low—the loin and leg full and deep. They are generally well-woolled sheep, but the wool is of a rather inferior quality. The peculiar merit for which this breed is noted is the production of lambs as early as the month of September. These being fattened for the London market, realize strong prices at and before Christmas. When the Leicester ram has been used instead of the Dorset, the lambs are disposed to fatten quickly; and as the difference of a week or a fortnight is very important, I consider the use of the Leicester blood may be advantageously extended. When they have been well kept they have been known to breed twice in the year. This, however, is only in exceptional cases.

The system of house-feeding lambs is here carried out very fully. The profit of this system depends very much upon the time the lambs are ready for market. If they are fat during the month of December, the practice is very remunerative; but should the lambs, from neglect or any other cause, not be ready, the value rapidly declines after this time. The lambs are confined in small pens, five or six together, and after being suckled in the morning, the ewes are turned away to a piece of sheltered grass, on which they have turnips and hay given to them. About the middle of the day the ewes are brought back again to their lambs for an hour, after which they are again turned out for the afternoon, and on their return they remain with the lambs all night. Any ewes which have had their lambs sold are brought

in between the meals and held whilst other lambs suck them. Thus by keeping the ewes well fed, and the building clean and healthy, the lambs thrive rapidly.*

Gloucestershire brings before us another entirely distinct breed of sheep, possessing many valuable properties. The Cotswold sheep are so called from the Cotswold hills, upon which they are fed. They are a very hardy class of sheep; and though the meat is coarse in quality, this is partly counterbalanced by their heavy weight. The fat tegs of fifteen months old will average from 24 to 30 lbs. per quarter. This is certainly a great weight for this early age, and no West of England breed can equal it. They also carry heavy fleeces; the ewes average 6 or 7 lbs., and the tegs range upwards from 7 and 8 lbs. They cannot, however, run these sheep as thick on the ground as smaller sheep; but we shall have another opportunity of considering the influence of this upon the merits of the breed. Being bred in an arable district, a succession of crops has to be raised for their support, and as meadows are rare, they have turnips, swedes, vetches, clover, and rape to carry them through the year.

Hampshire.—In this county we have also an indigenous breed. It has been, no doubt, very much modified in many respects from the original sheep. At the present day, however, the Hampshire Down sheep may be distinguished by certain characteristic features from other Downs. The introduction of South Down blood has in many cases lessened the points of difference, but there are general peculiarities by which they may readily be known. They differ from the South Down in being blacker and coarser in the face and legs—the bone heavier—greater weight of flesh, and larger in the head and neck. They are as active as the South Downs and more hardy, but are not considered equally kind feeders. They are well suited for the Downs, being active and close feeders. Their round barrels, deep and wide chest, and broad loins are well adapted for their habits of life, and for adding to their value when slaughtered. The system of folding sheep, so extensively practised around the Downs, requires a sheep of this class,—and certainly better travellers and folding sheep are qualities seldom found combined in the same animals. During the day, the custom is for the sheep to wander over the Down—near and at the close of the day they are brought home and folded on the land; sometimes they may receive some vetches, but far more frequently they are folded on the bare ground. In such cases they depend upon the Downs for their subsistence. During the night

* The old Dorset sheep has been recently remodelled into a highly-cultivated animal, and is now designated at the meetings as the "Somerset and Dorset Horn."
—R. S.

the fold becomes manured by the sheep, and after having been well moved about in the fold on the following morning, they are again despatched to the Down to gather as on the preceding day, and deposit their accumulations in the fold at night. This is termed "working" the flock, and it is a very correct term, for it is regularly making them conveyances for manure from the Down to the tillage land. For this duty no sheep surpasses the Hampshire Down.

Having described the local breeds, it may be desirable to specify those which have been introduced from other districts. *The Leicester sheep* have extended more through the West of England than any other breed which is not of local origin. A few pure flocks are kept in the district, but these are chiefly for ram breeding. The cross from the Leicester has been introduced into almost all our local breeds. The Leicester sheep is one of the most perfectly developed of our many improved breeds, and the symmetry it possesses is a model worthy of imitation. The form of the Leicester is familiar to most of us. The head is small, gradually tapering to the muzzle, and without horns. The eye is bright, but placid—the neck gradually increases in thickness from the head until it is lost in the chest without interrupting the level of the back—the chest is wide and deep. The ribs well arched from the back bone, from which there is a gradual slope of the body to the hind legs, which are deep and fleshy. A breed possessing these points may well be highly esteemed, and we can at once understand the cause of so much good resulting from their use.

The South Down has many admirers, and certainly possesses valuable properties, which have been brought to a very high degree of perfection. They have speckled or grey faces, much shorter and smaller than the Leicester. The neck is rather small behind the head, gradually enlarging into the chest. The chest is wide and projects boldly forward—the back is level, and with the full development of the rump, loin, and ribs, we have a broad and flat surface which no other sheep of the size can equal; the bones are small and fine, covered with a close speckled wool, and their fineness appears the more evident when contrasted with the well formed muscular body they support. Their peculiar points of excellence are the quality of the meat, the shortness of the pasturage on which they thrive, combined with an early maturity, which can only be exceeded by the Leicester.

The respective merits of these breeds now claim our attention. The influence of the Leicester blood has certainly been most extensively tried in this district, and offers an opportunity for considering, not merely its own merits, but how far they may be communicated to other breeds of sheep. The earliest and most

marked improvement of the Cornish sheep is owing, to the enterprise of Mr. Peters,* who "from 1810 (when he introduced a waggon-load of ewes and a ram) down to 1841, was the only person who held public sales for the letting and selling of rams in the county." His produce was renewed from the Dishley stock during this period, and the alteration in the character and quality of the Cornish sheep was very marked. Under this influence we find the sheep of that county becoming superior feeding animals, and especially producing a better and heavier fleece than before. The old Cornish sheep, when two years old, used to average about 10 or 11 lbs. per quarter; but the cross from the Leicester has entirely altered their character, for now at fifteen months old they are sold at 20 lbs. per quarter.

The same benefit resulted from their use with the South Hams Notts; in this instance this naturally coarse-fleshed sheep not only improved in quality, but carried better and finer fleeces. The Bampton ewes, when crossed with a Leicester ram, produced sheep which, whilst they partook of the fattening tendency and early maturity of the Leicester, retained much of the hardy nature of the ewes. In the South Hams sheep, as well as in the Bamptons, we may mark this progress towards earlier maturity. Originally the South Hams did not make 24 lbs. per quarter until 30 months old; now they reach this weight in half the time. The Bamptons used to average 22 lbs. when 20 months old; now they make this weight 3 or 4 months earlier. Part of this is to be referred to a superior mode of feeding, but chiefly to the Leicester blood. The original difference between the two breeds accounts for the greater improvement of the one than the other.

The weak point of the Leicester is a delicacy of constitution which produces heavy losses in exposed situations, and this is very frequently observed in our west-country flocks, when they are getting too fine, or, in other words, have too much of the Leicester blood in them. The greatest benefit has resulted from the Leicester rams when they have been used with hardy and strong ewes, which could impart to their offspring a strong constitution, whilst from the ram they get an aptitude to fatten early, and a good fleece. The Bampton ewes were in this respect eminently calculated to produce excellent half-bred stock. They were naturally a valuable class of sheep, and, with their strong constitution, were prepared to combat with the hardships of exposed situations. This is of paramount importance in the West of England, for it must be remembered that it is not simply the cold of these exposed situations which they

* 'Journal of the Royal Agricultural Society,' vol. vi. p. 448.

have to bear, but *the cold accompanied with wet*, which becomes far more trying to sheep. This is due in a great degree to the loss of animal heat in evaporating the water from the fleece. Thus the Bampton sheep were well inured to this exposure, and able to bear with it, consequently the Leicester blood improved them *until they began to show the delicacy of the Leicester*, which was at once a proof of having gone too far with the cross.

The South Hams sheep were coarse and slow growers, but being in a district much more favourable for sheep than the north of Devon, the Leicester cross can be carried farther without doing any harm in this respect, but they imparted to the South Hams a disposition to early maturity, which they needed very much. In the south of Devon we find many flocks *almost entirely* Leicester, and only a small proportion of the South Ham blood, answering exceedingly well; but in the north of Devon and Somerset, where the Bamptons are found, we are constantly hearing breeders say, "My sheep are getting too fine." For this reason the improved Bampton rams are far more used in these parts than the pure Leicester. These improved Bamptons may be described as combining as much of the Leicester blood as they can do without producing a delicacy of constitution—thus deriving the greatest amount of good from the breed with the least sacrifice.

The Leicester has been used with Exmoor and Dartmoor sheep, but unless the produce has been disposed of as fat lamb, they have not been able to withstand the cold of these districts. But although the pure breed has not been serviceable in this respect, yet the improved South Hams rams have been used on the Dartmoor, and the improved Bampton rams on the Exmoors with the greatest possible success. The crosses thus produced answer uncommonly well for early fat lambs, and when reared for stock they are very much prized, and especially the latter. These half-bred sheep are much sought after around the moors, and are kept as breeding stock. They are exceedingly healthy, and can withstand bad climate, whilst at the same time they produce heavy sheep. Being less than one-half Leicester the person breeding from them suits himself with a ram accordingly; if he is in a bad climate he will probably cross them with another half-bred sheep, and if he can bear more Leicester blood he selects his ram of finer quality. We must, therefore, carefully allot to the Leicester blood its fair share of the influence; for although the Leicester rams do not answer when used pure, still it is the Leicester blood in these improved South Hams and Bampton rams which enables them to be successful.

The hardy constitution which is conveyed from the Bampton sheep is exceeded by that given by the Exmoor. In fact a mere

strain from the Exmoor exerts a very marked influence upon sheep of delicate constitution.

The Leicester sheep may answer very well in the rich vales of Taunton and the Exe, but when the climate becomes exposed and severe they immediately show signs of delicacy of constitution, and the flock becomes predisposed for any epidemic or other disease which may be general. The chief value of the Leicester sheep arises from the quality they impart to other breeds which are naturalized to the climate of the district, and capable of withstanding the prejudicial influences which operate. Hence, with very few exceptions, those who have flocks of pure Leicesters are ram breeders, and keep them chiefly with this view. The circumstance of a Leicester flock being preserved pure simply as producers of mutton is exceedingly rare, and these are confined to the vales.

The South Down is a very valuable class of sheep, but more particularly suited to a dry climate. The native district of these sheep—the Sussex Downs—has a very different climate to the West of England. There the herbage is short, dry, and sweet, and the seasons are dry, but here we have a longer, coarser, and more juicy grass, and a wetter climate. Thus the natural district of the South Down does not accord with this district. On the Sussex Downs probably no sheep can equal them for thriving upon the close sward of those hills. In consequence of this difference in the districts there are very few flocks of South Downs kept in the west of England, except as a *fancy* for the supply of the tables of some of the aristocracy, and if we exempt the counties of Dorset and Wilts, the cross is not general between South Downs and other breeds. In Dorsetshire and Wiltshire this is done very extensively. The South Down ram is here used with Wiltshire Down ewes when the flocks are getting too coarse and not well disposed for fattening. In such a case the South Down ram is beyond question the most suitable sheep. This is quite a natural district for the Down sheep, and a less active sheep which has been accustomed to the rich lands of the vale would almost starve, whilst these hardy mountaineers thrive and fatten.

The selection of the best sheep for any district is not simply a matter of fancy. It is not that the Leicester, or the South Down, or the Cotswold, or any other breed are the best sheep apart from *the circumstances which regulate their value*—viz., the district for which they are required. I speak of the South Downs as possessing a very high degree of merit for the Downs, but practice shows that they are only allowed to carry the palm on their own native Downs of the East of England. In Dorset and Wilts, upon land of the same description, *but in a more western climate*, the pure South Down does not answer best. As the

Leicester rectifies coarseness, encourages early maturity, and corrects many defects in other breeds which it cannot supplant, so the South Down does with other breeds in the Down district. A cross between the Leicester and a Down ewe would produce a good feeding sheep for low lands, but it would be of decidedly less value for the short herbage of the Downs, whereas the South Down ram would have imparted to the progeny the improved character required, together with the active disposition so necessary for a life on the Downs.

A very interesting instance, showing how far the district influences the value of stock, is given by Mr. Ruegg:*

“ It is somewhat curious that whilst the Downs will fare better on poor land than the Dorset horns, on the stiff and rich soils of the vales they fare worse than on what seems their natural locality. Mr. Pope having a flock of pure Downs at Toller (in Dorsetshire), sent some of the best of them to his rich land at Maperton—a horn country—and he found the *poorest Downs on the thin land* at Toller do better than *the best Downs on the rich land* of Maperton.”

That valuable breed known as the Shropshire Downs affords another instance of the beneficial use of the South Down blood. The original Shropshire Down sheep were large coarse sheep, but by the judicious use of South Down rams a breed has been produced which merits our highest praise, combining as they do the weight of the Cotswold with the quality of the Down.† Thus, whilst the South Down cross acts in the same manner as the Leicester, imparting improved qualities for fattening and early maturity, still their selection can in no way be said to be indiscriminate.

The peculiar value of the South Down is to impart quality, a disposition for fattening, and early maturity, in an active class of sheep suited to hilly pastures in *dry climates*. Thus, whilst valuable as hill sheep, the district is again limited by the climate. In a wet climate, in which the herbage is often rank, we do not find the South Downs holding this position. They can stand the cold but *dry* climate of our Downs; but the *wet* climate of the hills of the West of England limits the use of this truly valuable east-country sheep.

For a mountain sheep for the extreme West of England, there are none which can surpass the Exmoors. The best flocks of this breed possess the highest degree of hardihood, and suffer less from the climate of the West of England than any other breed possessing similar quality. Possibly, the Dartmoor sheep possess the power of endurance as fully as the Exmoors, and, if

* ‘Journal of Royal Agricultural Society,’ vol. xv. p. 431.

† This practice has been by no means general; the old breeders strongly object to it.—R. S.

they had been taken as much care of, might have equalled them ; but they have never received the attention which has been given to the Exmoors, and they therefore hold for the present an inferior position. The best flocks of Exmoors possess a very high degree of symmetry, and they have constitutions suited to our western climate which no other breed can surpass.

The Dorset sheep are generally kept pure, because any cross appears to render them less valuable for early lambs. The South Down rams have been crossed with them, and the result has been an excellent class of *store sheep*, which produce heavier weights both of mutton and fleece : they thrive rapidly, but fail to breed so early in the season. The Leicester ram is only valuable when the lambs are going to be fattened ; indeed this cross is not liked when the produce are to be retained for stock.

The Cotswold sheep are found in their purity on and around the Cotswold Hills of Gloucestershire. The merits of this breed consist in having hardy constitutions, heavy carcasses, and good fleeces ; but they are more adapted for the drier climate of the Cotswold Hills than for the increase of wet in the South-west districts. The Cotswold sheep have been tried with more of the local breeds, but the produce has scarcely ever been approved. The half-bred Leicester and Cotswold is the cross which is most liked of any ; but these are by no means common. They are only liked upon land of good quality, and are seldom found south of Somerset. The produce from this class is larger, coarser, and more fleshy than the Leicester. The general result which the introduction of the Cotswold blood effects is, an increased size, accompanied with a degree of coarseness which is not needed by the native breeds of the West of England.

The cross in which the Cotswold has produced the most marked result is in the breed known as the Cotswold Down sheep now called Oxford Down. In these the good qualities of the two breeds appear to be combined, for we have not only *the weight* of mutton and fleece of the Cotswold, but *the quality* of the mutton and fleece of the Down. They can be folded almost as well as the Down sheep. These sheep, however, are only suited to the rich lands of the Midland and Eastern Counties, and if any one thought to be equally successful in the West of England, I think he would be disappointed. The Cotswold may be advantageously used when it is necessary to give greater weight and stronger constitution to a weaker description of sheep ; but this is seldom needed in the West of England, and hence I doubt if the Cotswold sheep can be of much service here.

In carrying out extensive improvements amongst the sheep of any neighbourhood, it will seldom be found desirable to import any fresh breed of ewes from a distance. This always involves

much expense and risk. The local breed of ewes will, in 99 cases out of 100, have to be the foundation of the improved flock. In the first place, they will be found to be naturalized to the district, and, if it is an old-established breed, it is probable that any striking peculiarity they may possess will be found, on examination, to have been given by nature to meet the requirements of that climate. By the exercise of judgment in the selection of rams, the produce may be improved step by step, until at length they have been made as good as the district will allow or justify. Any trespass beyond the line nature has assigned is soon productive of loss. The breeder thus gets reminded very forcibly of the false step he has taken, and, if an observant and prudent man, he will take the first note of warning.

THE GENERAL PRINCIPLES OF BREEDING.

Upon this subject there is great diversity of opinion, and the obscurity which surrounds it renders it rather difficult to systematise our observations, so as to refer each effect to the cause producing it. There are many conflicting and antagonistic agencies operating, and thus the ground becomes doubtful, and our opinions are consequently liable to error. I shall, however, endeavour to thread this maze, and explain the principles operating as clearly as the nature of the subject will allow. Every day's experience shows us that the offspring possess peculiarities of form and disposition which had been possessed by one or both of the progenitors from which such offspring has descended. These peculiarities are hereditary to a greater or a less degree, according to circumstances. Here we must be content to know that such is the fact: the manner in which these peculiarities are conveyed is beyond our full comprehension. Whilst, however, it is of little practical importance to know how it is accomplished, it is highly desirable to be able to *control* this communication of hereditary character, so as to transmit *certain* peculiarities from each of the parents.

It is well known that in the breeding of stock we do not simply want to produce an animal possessing the character of the wild ancestry from which it may be descended, but we require an animal suited for domestication. Instead of the wild, savage temper, we want a mild and docile disposition; and, instead of the powers of speed and defence, we desire a peaceful and quiet animal, which will luxuriate amidst our fertile fields, and become ready for our use within the shortest time practicable. This is requiring conditions which are quite abnormal, and hence special difficulties impede our practice. Change of habit gradually induces a modification of the body, and that which at first

may be simply peculiar may be perpetuated, and thus it becomes more firmly rivetted into the system. An accidental peculiarity is no longer *accidental* after it has descended from parent to offspring, and, should it be again transmitted, the peculiarity becomes more and more a permanent feature of the character. In this manner there appears to be a concentrating power of transmission accumulating in the system, which is decreased in the offspring when either of the parents does not possess this peculiarity, but is much increased in the progeny when both the parents are distinguished by possessing it.

The principle is equally applicable, whether the peculiarity is important or unimportant, for like as we see trivial peculiarities perpetuated, so also are habits and dispositions of the mind, as well as the conformation of the body, rendered hereditary. In this manner the breeds of sheep, possessing the qualities we require, have been produced from a few individuals in which these conditions showed themselves. As I said above, each transmission of character renders that character more and more a part of the animal's nature. Now, this is a most important principle in breeding. If, for instance, I take a Leicester, which has been bred from parents possessing the same character for ten generations back, we have the power of transmitting these peculiarities *intensified* in the system by this long-continued concentration. If this sheep were bred with a ewe of mixed descent, it is clear that the power of the ram to render his peculiarities hereditary must be far greater than the power of the ewe, which has no settled character concentrated in her system. In the case of the ewe, the *mixed* character of her ancestry has been perpetually neutralizing some peculiarity which may have been previously received; but with the ram, on the other hand, in each successive generation, we see special features confirmed and rendered more permanent. Here we see the value of a long pedigree, showing *pure* descent.

The late Lord Spencer, many years ago,* expressed his conviction that a *first-class* male would produce better stock from a female without any pedigree, than from another of medium character; and the above principle explains the reason, for if the female is without any line of pedigree, there can be no *concentrated* power in the system: whereas, if there were a pedigree of inferior character, there would then be a concentration of inferior qualities to balance against the influence of the male. In the former case we have the male conveying hereditary dispositions, and character without any *concentrated* influence on the part of the female, and consequently the progeny will, in such a case, be

* 'Journal of Royal Agricultural Society,' vol. i.

very much like the sire. In the latter case both have tendencies to perpetuate, although in different degrees of intensity, and hence the progeny cannot take so fully after the male as in the former case. Now, as we presume the male to possess *the better qualities* of the two, this is an evident disadvantage.

The clearest experiments which I know illustrating and confirming these principles took place in France, under Mons. Malingiê-Nouel.* Various attempts had been made to improve the French sheep by the use of English rams, but the result was invariably disappointment—the offspring being really inferior to either of the parents. In fact, they retained the undesirable peculiarity of the French breed, and added thereto the weak constitution of the English sire. It, therefore, became evident that the French ewes had a power of transmission greater than the English ram, and upon consideration it occurred to Mons. Malingiê-Nouel, that if he could secure greater length of pedigree in the male than the female, he should be able to overcome the resistance of the French ewes. The reader must bear in mind that the French breeds of sheep had been bred with scarcely any mixture in each province for long periods of time, for the breeders, instead of experimenting by the use of fresh blood, continued to breed, year after year, from sheep possessing similar character; thus their *bad qualities* became intensified in the strongest conceivable manner. On the other hand, the English rams had not many generations to boast of since they had been themselves improved by skilful breeders, and from this period alone they could commence intensifying within themselves their own *new* character.

It was impossible therefore to add force to the English rams, but it was possible to weaken the opposition of the ewes, and this was done in the following ingenious manner. Mons. Malingiê-Nouel went to the borders of Berry and La Sologne, and here he procured some ewes which had sprung from the mixture of the two breeds, and these he crossed with a ram from the borders of La Beauce and Touraine. He says:—

“From this mixture was obtained an offspring combining the four races of Berry, Sologne, Touraine and Merino without decided character, but possessing the advantage of being used to our climate and management, and bringing to bear on the new breed to be formed, an influence almost annihilated by the multiplicity of its component elements. Now what happens when one puts such mixed-blood ewes to a pure New-Kent ram? One obtains a lamb containing $\frac{25}{100}$ of the purest and most ancient English blood, with $\frac{75}{100}$ of four different French races, which are individually lost in the preponderance of English blood, and disappear almost entirely, leaving the improving type in the ascendant. The lambs produced strikingly resembled each other, and even

* ‘Journal of Royal Agricultural Society,’ vol. i.

Englishmen took them for animals of their own country. But what was still more decisive when these young ewes and rams were put together, they produced lambs closely resembling themselves, without any marked return to the features of the French races, from which the grand-mother ewes were derived.”*

This illustrates and confirms one of the first principles of breeding, and, when fully understood, clears away much of the mystery which envelopes their action. I have been as explicit as possible, because a clear understanding of this influence enables us fully to judge of the operation of the old maxim of “like producing like.” This must be accepted with certain modifications; for, suppose the ewe to possess a tendency to produce lambs of coarse growth and character, whilst the ram, on the other hand, has a tendency to produce a finely developed animal, it is clear that the offspring cannot possess these opposite characters. They therefore neutralize each other to a certain extent, and the subsequent hereditary power remaining prevails, and is rendered evident in the lamb. If the ram and ewe are equal in this power of transmission, then the lamb will partake of a medium character; whereas, if the ram possesses the greater influence, the lamb will be most like the sire, and *vice versa*. As in the case of Mons. Malingié-Nouel, we may be unable to increase the power of transmission in the male, but we may weaken the power of the female by producing a conflicting influence, which will neutralize her capability of hereditary transmission, and thus give the ram the entire ascendancy.

Another principle of breeding which needs some comment, is the relative influence of the sire and dam upon the size of the produce. This is a subject which has often occasioned doubt in the minds of breeders. It is subject to the influence of the former principle to a certain extent, but, in addition to this, other agencies are here called into operation. A flock of ewes may be small, and circumstances render it very desirable that more weight should be produced. The fear naturally arises in the mind, that by the use of a ram of larger proportions than the ewe, there will be a difficulty in lambing, arising from the large size of the lamb and the small size of the ewe. Now such a fear is groundless. The size of a lamb at birth appears to be in no way dependent upon the male. I have had lambs from small South Down ewes, got by Down, Cotswold, and Leicester rams—the males differing to a marked degree in size—but the lambs at birth showed no difference in size.† This is by no means an exceptional case, and I could produce many other instances to corroborate this result. It is, therefore, clear that the male has no power to

* ‘Journal of Royal Agricultural Society,’ vol. xiv. p. 220.

† This is not the case with the Exmoor ewes; their cross-bred progeny are much larger on the drop than the pure-bred are.—R. S.

influence the size of the produce before birth, but that it is solely dependent upon the ewe. The fertilised germ possesses inherent properties, which are to become manifest during life, but prior to birth its development is dependent upon the dam. Its growth is regulated by the size of the ewe, and the nourishment she gives it. If whilst the ewe is pregnant, she is fed *too well*, there is an unusual amount of nourishment flowing through the system, and the result is the lamb grows too rapidly, and the birth is attended with difficulty and danger. On the other hand, if the ewe appropriates the nourishment to herself instead of the lamb, the growth is small, as is generally the case with fat ewes. If the ewes are badly kept, the lamb is small and weak at the time of birth, and many perish subsequently in consequence. Mr. Pawlet says* :—

“Before I kept my ewes well, I lost many lambs when young, it being my usual custom to keep them on Swede turnips. A few years since, I determined to keep them better, by giving them, with turnips, plenty of good hay every day for three or four weeks before they lambed. I tried this plan with the first 100 ewes that were to lamb, and I scarcely lost a lamb out of the 100 ewes. The next lot of 100 ewes were kept on Swedes that had been eaten off to pecking without any other food, and the consequence was that a great many lambs died. They generally came alive, but died in two or three days afterwards.”

My own experience and observation lead me to the conclusion, that although the influence of the male may operate upon the character and qualities of the embryo, yet *its development prior to birth is entirely dependent upon the size of the female*, and the nourishment given by her. After birth it is clear that the character of the lamb has a fuller opportunity for development. If the ewe gives a full supply of milk, then the development of the lamb's natural peculiarities proceeds according to the hereditary influence it has received from its parents. Thus in many cases we see ewes of small size, which have lambs that—notwithstanding being of the ordinary size at birth for such ewes—yet, from the influence conveyed to them from their sire, make a rapid growth after birth, and often are suckled by mothers of less size than themselves.

These are, I conceive, the true principles by which the hereditary tendency of animals is controlled, and it now only remains for me to add, that this hereditary tendency extends to every part of the system and disposition. The peculiarities of formation which render sheep more or less valuable, and which we shall have to notice subsequently, are subject to these laws, and may be communicated from one animal to another under their controlling influence. Hence it has been generally admitted, that it is easier to bring a flock of sheep to a high degree

* ‘Journal of Royal Agricultural Society,’ vol. vi. p. 365.

of perfection, than, having accomplished this result, to maintain them in equal quality. If there are other flocks from which rams of similar character, but of distant relationship, may be procured, the difficulty is decreased materially, for then it becomes a simple question of selecting ewes having similar deficiencies, and rectifying these by the use of a ram well developed in these particulars. When a flock has been brought to a very eminent position, breeders are jealous of having to introduce the blood of their rival breeders; hence this point has to be gained in another way.

Mr. Pawlett, a ram breeder of high repute, and the author of an Essay on Sheep,* says:—

“From a long experience and close attention to the subject for more than 20 years, my mind seems more disposed to favour breeding in and in, rather than changing from one flock to another. I do not recommend that animals closely allied should be put together generally, yet I have known a very good sheep, for instance, produced by putting the son of a ram called A to a daughter of A, in cases where their points would suit each other, and I should never hesitate to do so.”

Mr. Robert Smith, whose reputation as a ram breeder is equal to that of Mr. Pawlett, and who is the author of the Prize Essay on Sheep,† takes a very different view of it. He says:—

“With crossing and breeding in and in, I have been lamentably disappointed, there being no dependence on the first, and no size to be procured in the latter; even in “breeding in the line,” much depends upon the union or knowledge of matching the male and female, particularly if selected from different families even of the same race, which have been for some time raised in other localities, and consequently influenced by climate, soil, situation, and treatment. When using rams of the same flock, they should by no means be used nearer than a *third* remove in the same line of blood. I have, by repeated experiments, experienced by the nearer affinities of blood the most decided disappointment, but have raised some first-rate animals by putting the third removes together when attention has been previously paid to the sort required.”

This is the experience of two celebrated ram breeders, and it is worthy of our careful consideration. Thus, whilst Mr. Pawlett does not recommend, but still does not object, to breed together a ram and ewe which are the offspring of the same ram, Mr. Smith considers it objectionable to breed so close, and he finds the offspring of two such sheep to produce the best stock when the third removes are brought together. In the former case, the ram A stands in the relationship of *sire* to the two sheep to be bred together; in the latter case, he stands as *great grandsire* to both. In this way, by *diverging* from a favourite sheep, we again converge, and probably produce one or more sheep of the utmost value to that flock, as presenting some distance in relationship without any sacrifice of family merit. This confirms the principle before explained of concen-

* ‘Journal of the Royal Agricultural Society,’ vol. vi. p. 362.

† Ibid. vol. viii. p. 25.

trating by every descent the peculiarities of the family instead of crossing, and thereby neutralising their hereditary peculiarities. Thus, "breeding in and in," and "breeding in the line," have both the effect of intensifying the powers of a sheep for the transmission of its hereditary character, whilst crossing must of necessity weaken it, because of the neutralizing action of any cross. There are objections to "breeding in and in," such as a decrease of size and an increasing delicacy of constitution; but no objection has been raised to it on the ground that the males failed to improve the character of the progeny. On the other hand, it has often been a subject of surprise, that males "bred in and in," and presenting a weedy appearance, should, when crossed with inferior females, produce offspring far more perfect than either of the parents.

Having noticed the principles of breeding, I now glance at the practice. The first step is to decide upon the produce required. If it should be required to produce first-class rams, then the foregoing principles must be carried out in all their integrity, and the great object should be to keep the produce up to the standard of quality, whilst, at the same time, the breeder is concentrating in them the influence which renders them most valuable. When the object is simply to produce mutton, it is clearly best to secure a male with a powerful aptitude for the formation of fat, and possessing this hereditary power of transmission in a very strong degree; but, as regards the female, it is desirable to secure a good nurse, a strong constitution, and a system generally well developed. In short, where mutton is the sole object, the ram should be qualified to impart a good development of system, and the ewe should be prepared to bring these qualifications to full maturity. Whatever may be the breed or breeds which other circumstances may render the most desirable, the same course has still to be adopted.

When fat lamb is the breeder's object, the peculiar qualifications of the ewe remain the same as before; but the ram should be especially predisposed to *early* maturity, and the more fully he has the power of imparting this to his progeny, the more valuable he will be as a fat-lamb breeder. In this respect scarcely any breed equals the Leicester. I have tried South Down, Leicester, and Cotswold rams for this purpose, with South Down ewes. The Leicester produce was heavier than the pure Down produce, and ready for the butcher two or three weeks earlier. The produce of the Cotswold ram was as much after the Down, and decidedly the most difficult to fatten. They seemed to grow rather than fatten, and, from subsequent observation of their lambs, it appeared to me that, to use the Cotswold to the greatest advantage, the ultimate heavy weight must be looked forward to, rather than early fattening. When they

have made their growth, they will fatten more rapidly than previously.

The selection of breeding sheep having been made, the next step is to decide upon the best time for lambing. Local experience can alone determine this point; and all that I can add thereto is a caution not to be so early as to have the lambs checked in their growth. After receiving such a check they never progress with equal rapidity afterwards, and later lambs often overtake and pass them. From the end of January to the beginning of March is the usual time for lambing to commence, according to the climate of the neighbourhood, except in the case of house-fed lamb. This being decided, the time for putting the ewes to the ram is readily calculated.

The period of pregnancy in the ewe is 152 days, or nearly 22 weeks. Mr. Pawlett took particular observations on a large flock for two years, and he found that—

				Weeks.	Days.
The longest time any ewe went with a ram lamb	was	22	4		
Ditto a ewe lamb	..	22	2		
The shortest time a ram lamb	..	21	0		
Ditto a ewe lamb	..	20	4		

The mean of these four periods is 151 days, which is exceedingly near the usual time.

A month or five weeks before the ewes are put to the ram, I find it a good plan to improve their keep, and get them into somewhat better condition. If they are in poor order at the time the ram is turned in with them, they take the male in a very straggling manner; whereas, if got tolerably forward they take the ram quickly, and the result is, that they lamb very near together. In this manner I have had 240 ewes out of 270 lamb within four weeks of their commencing to lamb. This saves a great amount of labour, for a long and tedious lambing time is very wearying work for shepherds. As the ewes take the ram they should be marked. This I have done at the end of each week, when they are plainly branded 1, 2, 3, &c., showing the week in which they took the ram; and in the same way I have those marked which turn again to the ram, and thus the shepherd knows the week of each ewe's lambing.

During the time ewes are in lamb they should be kept in fair condition, and neither rendered fat by too much food, nor almost starved for want of proper supplies. The injurious tendency of these practices I have already shown. Moderate supplies of food, so as to keep them in fair healthy condition, is best for them. Food of bad quality should be avoided, and also excessive quantities of turnips. When ewes are eating turnips the hay-rack should accompany them, as the hay gives a firmness to the food,

and is exceedingly desirable. They should have a dry and comfortable ground to lie upon. If kept on damp and exposed ground, and the weather becomes severe, they are apt to have the lambs killed before birth, and they are far more subject to this when the food is inferior in quality and deficient in quantity.

Nature requires that this should be a period of quiet and repose; anything like fast driving or frightening them should be carefully avoided. Much injury and trouble—far more than we generally imagine—result from sheep dogs. For my own part, I am exceedingly scrupulous in allowing their use, and especially after the ewes have gone to the ram. When sheep are kept on open land, sheep dogs are necessary, and also, under certain circumstances, they are necessary on more enclosed ground. I wish, however, to give a caution in passing, as I am convinced it is a cause of much trouble in the lambing season. Sheep dogs may be necessary on most farms, but their employment may be limited in the majority of cases with considerable advantage.

When the period of lambing approaches, convenient and comfortable arrangements should be made for the accommodation and care of the ewes and lambs. Few farms have sufficient yard accommodation for the ewes to be lambed in conveniently, and hence, in the majority of cases, it will be desirable to make a *lambing fold* somewhere near the homestead. For this purpose a dry spot should be selected, and a space proportioned to the number of ewes should be enclosed. Hurdles or wattles may be used, and, a double row having been firmly fixed around the space between them, may be filled with straw, and thus a sheltered inclosure is made. This fold is now divided into two generally equal portions, from east to west, and on the *north* side of the fold a series of little pens are made, each being about one hurdle square, and these are also separated by straw and double hurdles, and enclosed in front by an ordinary hurdle. If the ewes were going to lamb at the rate of fifty a week, I should have twenty such pens made, and, if the room on the north side of the fold is not sufficient, then use the east side in the same way; thus a favourable aspect is secured, and, by the temporary roof thrown over, the sheep have thus an excellent shelter prepared for them. The whole is well littered with straw.

A fold having been constructed in this manner, the ewes which are due the first week should be separated from the others a few days before their time is up, and brought into the *outer fold* every night. As they show signs of lambing, or as they lamb, they are taken into one of these pens, and there kept for two, three, or four days, according to the strength of the ewe and lamb. As soon as they are strong enough, they may be let out

of the pen into the *inner fold* in which the pens are situated, and here they can enjoy this increase of liberty until strong enough to be put upon a neighbouring paddock. This should also be provided with some temporary shelter, under which they may take refuge from cold and wet. Many may consider this too much trouble, and not worth doing. To such I only say, carelessness and indifference for the comfort of stock are not without a just recompense, and the loss both of ewes and lambs is the tax to be paid for such neglect. I have for many years tried this plan, and proved its *decided economy*; for, not only have the losses been very much reduced, but the lambs have improved as a body to such a degree, as alone to repay all the expense.

The fold being prepared as described, the comfort of the shepherd has now to be provided for. Much depends on his care and attention, and these cannot be expected unless the master shows some consideration for his comfort. It often happens that some small shed can be devoted to his use, near which the fold can be made, and in this shed he should have the convenience of making a fire. Many a time have lambs been saved by being brought to it for the night, especially when they have been dropped in rough weather, and got chilled. In the same way a supply of new milk may be warmed for any weakly lambs; and the shepherd should always carry a bottle in his breast-pocket, so as to keep it warm, and be at hand when specially required. The shepherd should also have a supply of gin and peppermint, which he should carry with him, and give a little to any lamb which may not be exactly comfortable, but still not so bad as to require to be brought home. Armed with these preparations, the shepherd is to a great extent safe from bad seasons and inclement weather, and, at any rate, it is always satisfactory to feel that every necessary provision has been made for the care of the flock.

It will be found a good plan, after a ewe has had a rather protracted labour, to give her two ounces of Epsom salts, and one or two drachms of laudanum, as this will have a tendency to keep down inflammation; but, if she is much exhausted, half a pint of warm gruel and a quarter of a pint of beer will revive her. If there is much pain, add two or three drachms of laudanum, and when the gruel is repeated, put into it two drachms of the sweet spirits of nitre. The following oils will be found very serviceable, and tend to prevent inflammation of the excited parts. The mouth of the womb (*vagina*) should be dressed over with some, and a small quantity may be poured into the bag, or uterus:—

Olive oil	1 pint.
Spirits of turpentine	2 ounces.
Sulphuric acid	6 drachms.

Mix in a strong basin, and, when cool, put into bottles for use. Others use a tablespoonful of brandy and the same of gruel, and wash the parts well. Both of these applications cause a re-action to commence, which prevents much after-suffering.

It may be desirable for me to notice here the diseases attendant upon lambing; and the first I shall notice is a low fever, which shows itself within two or three weeks preceding, or one or two weeks after lambing. It is a low fever which affects the spinal cord, consequently, the system generally; but, whilst the influence is thus diffused through the body, the inflammation attacks the weakest parts of the body in an especial manner—it may be the lungs or the bowels, but more generally the uterus. The appetite gradually fails, the sheep appears stupid, soon becomes giddy, and has a staggering walk. Should the lambing commence soon, the ewe will probably be relieved thereby; but this does not frequently happen, for in the majority of cases the lambs will be found dead. The course of treatment consists in separating the ewe from others, and giving it good shelter. Then examine the condition of the lambs, and they must be removed. Mr. Seaman* recommends that, in order to render the removal more easy, the vaginal cavity and the os uteri should be smeared every three hours with extract of belladonna, and the following medicines given:—

Calomel	8 grains.
Extract of henbane	1 drachm.
Oatmeal gruel	8 ounces.

Mix, and give two tablespoonsful twice in a day. Immediately after each dose of the above, give two wine-glasses full of the following mixture:—

Epsom salts	8 ounces.
Nitre	$\frac{1}{2}$ ounce.
Carbonate of soda	2 ounces.
Water	1 pint.

After the bowels are well moved by these medicines, give a wine-glassful of the following twice a day:—

Nitre	$\frac{1}{2}$ ounce.
Carbonate of soda	1 ounce.
Camphor	1 drachm.
Water	8 ounces.

The ewe should be fed on gruel or linseed porridge. The cause of this fever is generally to be traced to bad or deficient food, excessive fatigue, and close folding, but especially a sudden change from rich and good food to poor support. This often arises from breeders becoming alarmed at the fat condition of

* 'Journal of Royal Agricultural Society,' vol. xv. p. 386.

their ewes, and when they suddenly change them to poor keep to get them down in condition, there is a tendency to run into this low fever, which is so very destructive to many flocks, especially in the more eastern parts of England.

Cases of difficult lambing are often followed by *after pains*, which arise from an inflammatory action produced in the uterus from injuries received during lambing. The ewe should have the fever powders given to her (described below), with the addition of two drachms of laudanum in the first, and half a drachm in subsequent doses.

Soon after the lambing is over, the udder should be examined to see that the supply of milk is right. Should the udder feel hard and knotty, measures must be taken for altering it. It also frequently happens that the udder becomes inflamed, either from a chill caused by lying on wet land, or from some similar cause, and in both cases the treatment is very similar. The first object is to produce a flow of milk. For this purpose let warm fomentations be persevered in for an hour at a time, and let this be immediately followed by some lard *well* rubbed into the udder. This should be repeated every fourth hour, and the teats should be tried after the lard is rubbed in, to see if there is any milk in the udder. It is not necessary to use so much force as is often done in trying the teats. The inaction is not here, but in the milk-glands, and therefore towards these our attention must be directed. Fomentations and friction are the best agents to be employed. Whilst, however, this is being done, some cooling medicine must be taken to check the inflammation. For this purpose Epsom salts two ounces, and ginger one drachm, should be immediately given, and repeated four hours after, if the bowels are not acted on. Should the inflammation continue, give one of the fever powders every six or eight hours.

Tartarised antimony	.. ..	1 scruple.
Nitre	.. ..	1 drachm.
Digitalis	.. ..	1 scruple.

The first sign of improvement will be the appearance of the milk, and perseverance in the above treatment will generally restore the ewe to perfect health; but the shepherd must avoid her exposure to the wet and cold.

This deficiency of milk is often traceable to hereditary influence. I have seen instances of flocks being nearly spoilt by the addition of young ewes bred from rams imparting to them this bad character, and, in one case in particular, this could be clearly traced to the influence of one ram. Such extreme instances are rare; but I have no doubt the same influence is frequently conveyed in a less degree. No doubt, a ram bred from a bad milch ewe would have this influence; but, if such a ram were

put to another bad milch ewe, the produce would—supposing it to be a ram—do an incalculable amount of injury to the future flock. The small supply of milk which the ewes give is a *general complaint*, and breeders should not neglect it.

After this somewhat necessary digression, I must follow the management of the newly-born lamb. This, with the ewe, should be placed in one of the pens in the fold; and the ewe will soon restore the young one to activity and strength by licking. Should she be so weak as to be unable to do this, the lamb should be well rubbed with straw, and covered up with some more of the same. It will often happen, with all the shepherd's care, that some ewes will lamb unexpectedly, and the shepherd, on his rounds during the night, occasionally comes on a lamb apparently dead. Such a lamb should have its mouth opened, and by blowing into its lungs possibly they may commence action; then, let the lamb be well rubbed, and, if possible, place it near a fire for a short time. Many lambs put aside as dead may thus be restored; for, if the lamb has any warmth when found, there is hope.

When the lamb has commenced sucking right, the next point for attention is the afterbirth. This, with few exceptions, comes off within a very short time, but in other cases it is retained. There is little cause for anxiety at its retention, and a quarter pint of warm beer in some gruel will nearly always remove it. Within a few days the freedom of the inner fold may be given to the ewe and lamb, and as soon as the lamb is strong enough and the ewe sufficiently attentive for its proper care, they may be taken to some paddock, as before noticed. The singles and twins must be separated, for the latter will require more care and better food. Before the twins are turned away the pairs should be marked, more especially when the number is so large that the shepherd cannot recognise them.

A liberal system of feeding is now desirable for the ewes. I make a rule of laying up a piece of grass after a *late* mowing, and not having it stocked until the ewes and lambs are turned out: thus I get *firm* but nutritious food for them until they are ready for the water-meadow grass. Those who are fortunate enough to have good water meadows have here a *valuable* help for early spring feed; but others are dependent upon such supplies as mangold wurtzel, cabbages, early rye, then rye and vetches, afterwards vetches, clover, &c. Whatever may be the system which the peculiar character of the farm may require, still a *liberal supply* must be provided. If the ewes are going to be fattened as well as the lambs, then the addition of some artificial food, such as linseed-cake, will generally be profitable. When the lambs are able to eat some maldust, crushed peas, beanmeal, bran, cut clover-hay, &c., these may be given them in a trough

separated from the ewes by a lamb-hurdle, such as will enable a lamb to pass in but still keep out the ewes. Before, however, I pursue the management any further, I will proceed to notice the principles upon which such practice is grounded, and with this I shall endeavour to interweave the variations of practice which are observable in different parts of the West of England.

ANATOMICAL AND PHYSIOLOGICAL INFORMATION ILLUSTRATING THE EFFECT OF PARTICULAR MODES OF TREATMENT.

To arrive at any correct conclusion respecting this subject, we must know the peculiar functions of the animal system upon which we are acting, and having subsequently inquired into the nature and character of food, we shall be able to compare the variations of practice with the general principles which are thus called into action. Food when gathered into the mouth, there undergoes its first change, which consists partly in the grinding and fracture of the food in preparation for its subsequent digestion, and also the intermixture of the saliva. The former is a mechanical action and its utility is evident; for if any body is broken into fragments, it is clearly more subject to chemical changes than in its original solid form. The mixture of the saliva with food, although a mechanical action, produces a chemical influence on the food. The benefit resulting from the insalivation of food is referable to the air which is thus intermixed with the food. This fluid is secreted by the salivary glands which are situated below the ears in the sheep. The saliva thus secreted is conveyed to the mouth by two channels which unite near the cheek and pass thence into the mouth. The saliva has the peculiar power of enclosing air as in small bubbles, and thus, whilst by its softening character it renders the grinding of the food more easy, it also introduces air which promotes the chemical process of digestion, hereafter to be described. The food having been gathered by the incisor teeth, is rapidly passed in a semi-masticated state into the stomach of the sheep.

The sheep, in common with nearly all ruminating animals, has four stomachs, which are known as—

- The paunch, or *rumen*.
- The honeycomb, or *reticulum*.
- The manyfold, or *omasum*.
- The stomach, or *abomasum*.

The rumen is considerably larger than any of the others, and, in fact, occupies three-fourths of the abdomen. To guard against injury from being overloaded with food, it is partly divided into two compartments, being as it were looped up in the middle by a strong muscular development. This stomach is well furnished

with muscular strength for performing its functions fully and with energy. It is into this stomach that the pellets of food are received as they are hastily gathered by the sheep and stored away until it has collected a sufficient quantity, when the animal lies down for the purpose of ruminating.

The process of rumination is commenced by the return of a portion of the food from the rumen into the second stomach, and thence it is forced into the mouth; not the portion which has just been swallowed, for, in consequence of the peculiar action of the stomach, the food which is received into it has to travel around the interior of the rumen before it can pass to the mouth. In consequence of this, the animal commences with that food which has become most fully softened by maceration in the stomach, and which yields most readily to the grinding process of mastication. According to experiments which have been carried out by Spallanzani and Tiedemann, the food remains in the rumen fourteen or fifteen hours before its rumination commences, and when it is returned again to the rumen, nearly thirty hours elapse from its first reception to its passage into the third stomach. During the second and most complete process of mastication, the food is ground into a soft pulp. It is during this operation that the largest quantity of saliva is required, and it is singular that the peculiar motion of the jawbones in the grinding of the food actually stimulates the flow of saliva which is required for the right performance of this function. In this manner the food is reduced into a soft pulp and descends the throat, but as it approaches the stomach the muscles contract for the conveyance of it into the rumen: if sufficiently reduced it avoids the grasp and passes into the third stomach, but if not sufficiently reduced—as will frequently happen when from alarm or fright rumination is suddenly interrupted, or from the food being unusually tough—then the food is caught by the muscles and conveyed into the paunch for further maceration and mastication. Thus no food can pass into the third stomach until it is so much reduced that the muscles fail to grasp it and convey it to the rumen, and this insures the complete reduction of the food into a pulpy state, which being performed, the process of rumination ends.

The formation of the third stomach is very peculiar, and, as its ordinary name (manifold) implies, it has many folds or leaves. These leaves divide the stomach and increase very considerably the extent of surface, without occupying more room in the body. The function which this stomach has to perform is the prolonged maceration of the food. For this purpose the formation of the manifold is eminently adapted, for each of these leaves has the power of producing on its surface a secretion especially suited for moistening and softening the food. Thus we have another step

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to insure the full preparation of the food for the digestive process, and we must look upon these three stomachs as preparatory to the duties of the fourth stomach in which digestion commences.

The fourth stomach receives the food as soon as it passes from the manifold, and here it is acted on by the gastric juice which is secreted by the coats of the stomach. The function of the gastric juice is to render the food soluble, and from its peculiarly acid character it is well adapted for this purpose. So long as the food remains in this stomach it is acted on by the gastric juice: this process is known as *the chymification of food*, and the product is termed *the chyme*, which is very acid in its nature from the gastric acid it has received.

In *the lamb* this is the *only* stomach which is developed; the others exist in an imperfect state. The nourishment of the lamb being milk, it needs no preparation similar to solid food, and hence the three first stomachs are not required. When the milk is received into this stomach, it is acted on by the gastric juice, and the process of digestion commences as with ordinary food. A knowledge of this fact leads one to avoid giving lambs solid food early in life before the stomachs are sufficiently developed to prepare it properly for the digesting stomach. A sudden change from a milk diet to solid food would produce death in a lamb, and its use at an early period is not desirable, because it produces an irritation by entering into the stomachs whilst they are imperfectly formed, and this irritation often leads on to inflammation and death: it is far better to give lambs extra food through the mother for a time. Thus, for instance, instead of giving the lambs oilcake, let the mothers eat it, and (if the ewes are not too high bred) the lambs will derive the advantage of it.

From the fourth stomach the food passes into the duodenum, and here it receives the secretions of the pancreas and the liver. The pancreatic juice and the bile immediately cause considerable change in the chemical character of the chyme; for these fluids, being alkaline, whilst the chyme is strongly acid, decomposition is immediately produced, and the result is, that a white milky fluid, named the *chyle*, is produced, and the action which takes place is distinguished as the chylification of food: here the process of digestion ends.

Thus if we glance at the course of the food we are struck with the wise and abundant provision which is made for its collection, maceration, and grinding, and also to guard against its passage into the third stomach in an unprepared condition. This, indeed, is only another link in the preparatory changes fitting the food for digestion, whereby the nutritious matter of food is fitted for use in the system, and thus the solid food becomes changed into a semi-fluid milky mass ready to sur-

render the nutritious matter it contains. How this surrender is effected I shall now proceed to show.

After it has been retained in the duodenum for a time by means of its transverse bands, it passes through the small intestines. These consist of an excessively long tube, varying in size, but throughout presenting a very convoluted form. It is in this passage that we have innumerable absorbent vessels projecting from the sides of the bowels, each imbibing from the chylified mass all the nutritious matter which is in solution. These numerous contortions retard the passage of the matter through the bowels, and the extraordinary length affords full opportunity for the absorbent vessels to separate most fully all the nutritive soluble matter, and the residuum passes away as excrementitious matter. The absorbent vessels are called the lacteals, from the *milky* fluid they convey. The food thus collected is conveyed to the thoracic duct, and by it to the heart for circulation through the system. Thus the food of the animal, after being duly prepared, is then digested, and subsequently by the aid of the lacteals that which is valuable for the support and development of the body is separated and conveyed to the heart for diffusion throughout the body.

The circulation of the blood is carried out by the aid of the heart and a double set of blood-vessels, viz. the veins and the arteries. The heart consists of two auricles and two ventricles, or, to use more familiar language, I may say two receiving-vessels and two pumps. These are further distinguished as the right and left auricles and the right and left ventricles. The right auricle receives the blood returned from the system, together with the chyle and lymph, and, on passing into the right ventricle below, the blood is forced into the lungs. The lungs consist of a spongy cellular mass, and into these cells the blood passes; here it is exposed to the action of the air breathed into the lungs, with simply the intervention of the delicate cellular matter of the lungs. The result of this exposure to the air is that *the dark purple stream* conveyed to the lungs leaves it *a bright crimson colour*. Such is the evident result; but what is the real change? The dark colour of the blood is owing to the presence of carbonate of iron; when this is exposed to the air in the lungs the carbonic acid separates and is exhaled, whilst the iron becomes changed into a peroxide, and gives the blood its bright crimson colour. After this change has been accomplished the blood is forced back into the left auricle, and this completes the pulmonary circulation.

When the left auricle is full, the blood is passed into the left ventricle by which it is pumped through the body. From the heart this blood is conveyed by the arteries, and every part of the

body gets a share of this life-giving stream. As the arteries extend from the heart, so they throw off branches, and the main arteries become smaller as they get more numerous. These smaller vessels again subdivide and branch until the blood-vessels become like hairs, and are termed capillary vessels. These are found in every part of the body, and are the feeders of the system, both as regards warmth and nourishment. The blood having by this agency been most completely distributed throughout the system, is again collected into very minute veins, which gradually enlarge and join together until they form the large veins, which carry back the dark purple blood to the right auricle. Thus the blood performs a double circle, the former to the lungs for purification and final preparation, and the second throughout the system in which it has important functions to perform.

Such is a summary* description of the machinery of feeding, and now we shall find it desirable to examine the materials which are to be used, or, in other words, to enquire into *the nature and functions of food*. The object for which food is consumed is two-fold, viz.: to maintain the body in health, and to promote its development. In these we may comprise the following duties:—The maintenance of animal heat; the supply of material suited for producing fat and animal oils; muscular matter; bony matter.

The manner in which these functions are performed must now be noticed, and the first of these is the production of *animal heat*. We are all familiar with the fact, that animals have a greater degree of warmth in their bodies than inanimate objects. As a consequence of the laws which govern the conduction and radiation of heat, animal bodies are constantly imparting their heat to the colder media around them. Hence not only has heat to be produced in the body, but it has to be maintained. The manner in which this is done is very simple and beautiful. I have already said that the blood, on leaving the lungs, carried away with it a certain quantity of the peroxide of iron. It had also just received the chyle, in which the carbonaceous matter of the food exists. Immediately after the blood commences its circulation, a combination is set on foot between this carbonaceous matter and the peroxide of iron, and these produce carbonate of iron. Now by this chemical change, we have a quantity of heat produced, which when distributed throughout the body imparts the required warmth. As, however, the passage of the blood through the arteries is rapid, and does not become slow until it is passing through the capillaries, so it happens that this chemical

* I have been as concise as possible upon these and similar matters, as they have already been laid before the Society in a more detailed form.

change takes place almost entirely in these minute vessels, and thus not only is the heat produced in the body, but it is produced *throughout* the whole of the body. This heat, therefore, is obtained at the cost of the carbonaceous matter of the blood, and the practical influence of this principle manifestly is this—that to economize the carbonaceous matter of food, we must lessen the demands on the blood for animal heat; for as the heat of the body is maintained by this portion of the food, it is clear that the greater the demand for warmth, the larger will be the quantity consumed, and consequently the smaller will be the proportion remaining in the blood. This is the more important, because *this remainder* is converted into fat.

Fat and Animal Oils.—These are produced from carbonaceous matter, and although there has been very much disputation as regards the form in which bodies of this class should be presented to animals, so as to be converted into fat with the least difficulty, it appears to me that, for all practical purposes, we may adopt the principle that when oily matter is present in the food in a form congenial to the animal, this will pass into fat more readily than starch or sugar, but, in the absence of the former, the latter will unquestionably act as a substitute. In the greater part of the vegetable matter used as food, oil has been shown to exist, and especially in the seeds of plants. There is consequently little doubt of the supplies being available from this class of bodies. We have every reason to believe that the oil of seeds and vegetables generally is formed from the starch of the plant, in which case the starch undergoes a preparatory step, which renders it more ready for the animal body. In fact, there is scarcely any difference between the fat of plants and animal fat.

In the animal body during life, the fat exists in a liquid state, confined within small cells composed of matter very similar in composition to the fat itself. These cells must necessarily be formed before the oil which they contain; and this is the first step in the accumulation of fat upon an animal. When a *poor* sheep is first put upon fattening food, the skin appears to stick to the bones, and for a considerable time no fat is laid on, but gradually the sheep's skin becomes softer and more supple to the touch. This feeling is due to the formation of fat cells, after which the sheep fattens more rapidly than it previously did. In fact, when the cells are ready to receive the fat, this is soon deposited there from the fatty matter of the food. These cells cannot be formed rapidly, and hence it is that it is waste to give a lean animal large supplies of fat-producing food at the commencement of its feeding. A moderate supply is most economical at first, if the animal is out of condition; and as its skin

gets softer in handling, so we may know the cells are forming, and more fat-producing food may be advantageously given to the animal.

Fat is not largely formed in any but domesticated animals, and generally speaking, in these the fat is allowed to accumulate up to the period of passing into the hands of the butcher. It is sometimes found in wild animals to a small extent, chiefly towards the end of summer, but during the winter months it is lost. This arises from the fact, that the demands upon the heat of the body are greater in winter than the food can supply, and thus the fat is first taken up into the circulation, and if pressed severely by cold the fat cells are also lost. This occurs very frequently with the sheep on our Moors. At the end of the summer they are often in fair condition, but during the winter they lose it, and there is a difficulty to start them in the spring. This is entirely due to the fat cells being destroyed. The same food given to two sheep, the one of which has been run down so low as to lose all its fat cells whilst the other is in thriving condition, would by no means produce the same beneficial results. Much of the richness of the food would pass through the body without being appropriated, simply because these store-houses for the fat are being built, and until they are formed they cannot retain fat. As soon as the fat cells are formed, they are gradually filled with oily matter which remains liquid until after death.

The maintenance of heat and the formation of fat are consequently opposing conditions of life, and hence, to favour the latter, the demands on the body for the former must be reduced as much as possible. It is in this manner that warmth and shelter are considered as an equivalent for food.

Formation of Muscle.—This is produced from the *nitrogenised* matter of the food, which having passed as before described into the blood, is there found as *fibrine*. If blood is beaten with a bunch of twigs, we soon have strings of fibrine attaching themselves together. These strings or fibres are composed of a series of globules attached longitudinally, and they have been compared to strings of minute beads. This power of connection is exercised in the animal, and the fibrine which exudes through the capillaries thus becomes attached, and forms a series of these strings or elementary fibres, which become bound together by transverse bands of the same material. Thus, any portion of the body which is injured, or severely exercised, receives fresh supplies of fibre to add to its muscular strength. It has been shown, and indeed it is a familiar fact, that exercise causes waste of the muscles, but nature with bountiful provision has so guarded the safety of the animal, as to cause this waste to be

fully compensated. Hence those portions of the body which are most exercised receive most support, and instead of the exercise producing a decrease, it really tends to a fuller development of the part. Who has not observed the gambols of lambs; how they delight in taking exercise, and the beneficial influence it has upon their growth? The fact is, although, by this exercise, there is a waste of muscle, yet this loss stimulates an energy of growth which it is most desirable to encourage.

Formation of Bone.—This also is derived from the blood. If we examine the structure of any bone, we shall find that in its earliest form, it consisted of gelatinous cells, and in these the earthy matter of the blood is deposited, thereby giving it a degree of firmness which fits it for performing its functions in the animal. In young animals we find the bones disposed to bend, but as the lime salts become more abundant, they become firm and rigid as in the adult, whilst in the old animal the salts are found in excess from the waste of the gelatine, and then they become crisp and readily broken.

In order that any food may possess all these properties, it is clear that it must be of a very mixed kind. There is one food which is pre-eminently adapted for fulfilling all the requirements, and that is milk. Here we find all the elements required in proportions well suited for promoting the health as well as the development of the animal. Every-day experience testifies to the fact that to promote the early growth of the young lamb there is no substitute equivalent to milk. Here, then, we have a perfect food, and a knowledge of its composition will show that it contains all the essential properties of food.

Analysis of Ewe's Milk, by Henry and Chevallier.

Casein	4.50
Butter	4.20
Milk-sugar	5.00
Saline matter	.68
Water	85.62

100

Here we have the carbonaceous matter of butter and milk-sugar to support respiration, and thereby promote the warmth of the body as well as the formation of fat. The caseine is the nitrogenised matter which supplies the muscular growth, whilst the saline matter is present for the development of the bones. Thus in milk we have a food in every respect capable of carrying out a full and complete development of the body. Then comes a period when milk is no longer desirable, and the young animal has to gain its support from vegetable matter; and in this we

find ample provision and more varied in its form. The various protein compounds form flesh—the oil and starchy matter support respiration and form fat, whilst the ash of the plant yields the mineral matter for the bone. Thus, again, all the supplies needed are forthcoming. In practice, however, it is often necessary to vary from the natural course in some degree, and modify our proceedings for the attainment of special results. The selection of food, therefore, depends upon knowing what the animal requires for this special purpose, and also upon a knowledge of the composition of various kinds of food. Hence we see the value of those analyses which have been published and brought before this society. If in the early growth of an animal we wish to promote its full development, it is clear, that as every part of the system has to be supported, our food must embody all the materials required, and we must have nitrogenised, carbonaceous, and mineral matter present. As the growth increases, this should be steadily kept in view; for even now the loss of fat-producing matter will be against the animal's progress. When, however, the parts have become fully matured, and we want to finish the animal off by fattening it, then an additional supply of fat-producing matter is desirable.

The preparation of food is a question often under consideration: to a certain extent it is of service to sheep, but it has never been carried to the same extent with them as with other animals. The cutting of swedes is one act of this kind, and as it enables the animal more rapidly to get its supplies of food, it is an economy of time and the animal thrives more quickly in consequence. The cutting of hay into chaff, so far as it prevents waste, is also a good plan. Food, however, should not only be selected judiciously and presented in suitable form, but it should be supplied with regularity. Anything like a check in the growth is long observable in the progress of the animal, and therefore should be studiously avoided. Besides this there is nothing more calculated to produce inflammatory action in the body than sudden changes from good to bad keep, and from inferior to strong food. This tendency to inflammation being in the system, that part which is most susceptible to attack yields to its first influence, and it often terminates in death. Many are the diseases resulting from such opposite modes of feeding.

The economical consumption of food is very much influenced by the formation of the animal by which it is consumed. The result of experience has enabled us to distinguish between good and bad feeders, and we find the development of certain organs of the body determine the economy of the food consumed. Those which have small lungs and liver are especially noted for

their disposition to fatten well, and a moment's consideration will show how this result is occasioned. It must be remembered that fat is formed from the carbonaceous matter remaining in the blood after the heat of the body has been maintained to a proper degree. If a sheep has *large* lungs, it is clear it will breathe in *more air*, *more oxygen* will enter the blood, and *more of the carbon* of the food will be consumed, and *less* will remain for forming fat. On the other hand, if a sheep has *small* lungs, it breathes in *less* air; a smaller quantity of oxygen enters the blood, *less* of the carbon is consumed, and *more* remains to produce fat. It is a necessary consequence of the above, that when a sheep having small lungs is exposed to severe cold, it cannot breathe in sufficient oxygen to keep up the heat of the body, and the lower temperature induces disease—such a sheep is marked as *delicate*; whilst another with larger lungs can maintain sufficient heat to keep the body in health, and it is considered *hardy*. It is, therefore, a necessary result of producing a sheep with a strong tendency to form fat, that you render it unable to withstand exposure against which inferior bred sheep can bear up. This explains the variations in the choice of sheep for different localities, and the practical inference which may be drawn from a knowledge of the principles is exactly the same as practice teaches—viz., that every farmer must judge for himself how far he can render his flock fine, and endeavour to keep up a tendency for fattening as high as possible without rendering the sheep too delicate to withstand the climate of the farm.

The value of different *breeds* of sheep to a farmer is consequently regulated by the same principle; for the object is the same with breeds as with individuals—viz., to secure the highest amount of good character with the least amount of delicacy. It is for this reason that local experience is the only standard for deciding the relative value as flocks *for general purposes*. A most valuable series of experiments has been carried out by Mr. Lawes of Rothamsted, in which the relative value of several breeds *as producers of meat* has been fully tested. For the extent and completeness of the experiments, I know of none which equal them; the careful supervision and disinterestedness of motive are at once proofs of accuracy, and place the observations above all suspicion of partiality. This interesting series of experiments is fully and ably recorded in the 10th, 12th, and 16th volumes of the 'Journal of the Royal Agricultural Society.' The result of these experiments extending over a period of thirty months, and conducted upon 246 sheep, will be seen in the following table, which I have condensed from the statement made by Mr. Lawes:—

his I shall append Mr. Lawes's own comments upon the course of experiments, as they are very concise and explicit.*

* 'Journal of the Royal Agricultural Society,' vol. xvi. p. 87.

Consumption of Food.—Sheep of different breeds consume quantities of food in proportion to their respective weights when at an equal age, stage of feeding, &c. ; that is to say, three sheep weighing 100 lbs. each will consume the same quantity of food as two sheep of 150 lbs. each. Sheep on good fattening food—such as cake, or corn with chaff, and roots—will consume weekly about $4\frac{1}{2}$ lbs. of cake, $4\frac{1}{2}$ lbs. of hay, and about 70 lbs. of roots for every 100 lbs. of their live weight. When fed as above, they will consume every week about one-seventh of their own weight of the *dry substance* of food—that is, after deducting the moisture it contains.

Rate of Increase.—Sheep well fed, and under cover, will increase 2 per cent. per week upon their weight ; that is to say, 100 lbs. live weight will increase $1\frac{1}{2}$ to 2 lbs. per week. To increase 100 lbs. in live weight, sheep will consume about $2\frac{1}{2}$ cwt. of cake or corn, $2\frac{1}{2}$ cwt. of hay chaff, and $1\frac{1}{2}$ to $1\frac{3}{4}$ tons of roots. The increase of a fattening sheep is at the rate of about 1 lb. live weight to 8 or 9 lbs. of the *dry substance* of the food consumed.

Live and Dead Weight, &c.—Hoggets or tegs (under twelve months old), and in a lean or store condition, will contain about one half of their weight carcass, and about one half offal. Shorn sheep, sufficiently fat for market, contain about 56 lbs. of carcass in every 100 lbs. of the unfasted live weight. Sheep in an ordinary state of fatness yield from 7 to 14 lbs. of offal or loose fat per head, according to breed and size ; the long wools giving the least, and the Down the most.

Value of Increase.—The value of the increase of fattening sheep is less than the cost of the food consumed to produce it,—the difference is to be charged to the manure. The value of the total offal is from 4s. to 6s. per head independently of the wool."

These are *most valuable facts*, and the agricultural public are under deep obligations to Mr. Lawes for such a useful and important addition to our knowledge of food in its relation to sheep breeding. We must not, however, mistake their value, but remember the circumstances under which they were conducted ; for if we anticipate producing the same result, regardless of shelter and protection, we shall be deceived. The increase of weight produced by a certain quantity of food must therefore be considered as the result of shed feeding. With this exception, the other results are of general application.

There is another singular fact shown by these experiments—viz., that those sheep which made the greatest proportion of mutton from a given quantity of food, produced it of inferior quality ; whilst in proportion as they yielded a less weight, so the quality improved ; and although a higher price per pound may be paid, still there is no instance of full compensation for the
loss

Description of Sheep.	Average Food consumed to produce 100 lbs. Increase in Live Weight.			Extra Food beyond Cotswolds consumed to produce 100 lbs. Live Weight.			Marketable produce in 100 lbs. Unfasted Weight, including Wool.			Money-return at Average Rates of 100 lbs. Live Weight.			Difference of Money- return over or under Cotswolds for 100 lbs. Live Weight.	Cost of extra Food consumed beyond Cotswolds to pro- duce 100 lbs. Live Weight.	Excess of extra Cost over Money-return for 100 lbs. Live Weight compared with Cotswolds.						
	Oileake.		Swedes.	Oileake.		Swedes.	Mutton, sinking Offal.		Wool.	Mutton, sinking Offal.		Wool.				Total.					
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	oz.	lbs.	oz.	z.	d.				z.	d.	z.	d.		
Sussex	297½	285½	3835½	43½	68½	278½	53	3	4	0	32	5	5	0	37	5	+1 11½	7	4	5	4½
Hampshires ..	291½	261½	3966½	38	44½	409½	53	6	3	7	31	1½	4	3½	35	5	-0 0½	6	2½	6	3
Cross-bred wethers	264½	251½	3725½	10½	35	167½	51	2	4	10	29	10	5	7	35	5	-0 0½	2	10½	2	10½
Cross-bred ewes ..	263½	250½	3671	10	33½	113½	50	10	5	6	29	6½	6	6	36	0½	+0 7½	2	6½	1	11½
Leicesters	263½	251½	3761	10½	34½	203½	50	11	5	9	28	3	6	0½	34	3½	-1 2	2	10½	4	0½
Cotswolds	258½	216½	3557½	..	..	..	53	6	5	4	29	9	5	8½	35	5½	..	..	..	..	..

loss of weight. Here, again, we see the cause of the frequent cry, "I want more weight in my flock." Our practical men are shrewd observers, and soon detect any loss of this kind, and this is clearly their evidence. They want a certain degree of quality, but the flock must not be too fine. The selection of sheep, and the degree to which they can be profitably improved in quality, are continually vibrating like a balance: the observant breeder watches these indications, and thus he introduces weight-producing-blood or else a tendency to fattening, as he finds the scales indicate he is getting too fine or too coarse. The fact of depreciation in quality as the sheep produces a greater weight from a given quantity of food, is so important and so clearly marked in these experiments, that I cannot refrain extracting the table from Mr. Lawes's valuable paper before referred to. (See p. 95.)

Before leaving this investigation by Mr. Lawes, I must draw the reader's attention to the important fact that two sheep, weighing 150 lbs. each, would eat as much as three weighing 100 lbs. each. It confirms the opinions of many practical men who advocate the use of small sheep for certain districts, for which they may be desirable for *other* reasons. For example, should the climate of any district render it necessary to carry, say, for instance, Exmoor sheep, *because of their hardy nature*, there need be no regret because of their small weights, as the number can be increased in the same proportion, so that *the total weight* of mutton the land carries is the same in both cases, but with this important difference, that you gain the same produce without introducing a class of sheep which experience stamps as unsuitable.

I have already noticed, when speaking of hereditary communication, that peculiarities which are at first accidental become fixed elements of character when manifest in the offspring: so it is with the disposition for *early maturity*, which having been encouraged in the parents from generation to generation by high feeding from the time of birth, these communicated to their lambs this tendency to fatten early in life; but if such produce is badly kept whilst young, this tendency is checked, and *less* disposition for early maturity will be transmitted to the offspring. As we breed from sheep possessing this quality, and *by our mode of management encourage this peculiarity*, so we render it more and more a fixed feature of character; but by adopting an opposite course we nullify this influence. The reason is clear: if a young animal is well fed and has little exercise, the lungs are not brought into active use and are but feebly developed, whereas if the lamb has to roam about for food, and this of an inferior character, the lungs get more fully developed. The result of this difference in the size of the lungs has been already shown to determine the

quantity of carbonaceous matter which shall be reserved for fat. Thus the early habits induce a degree of indolence and a disinclination for exercise which increases in the animal with its growth, and is transmitted to its descendants to be removed or confirmed by the subsequent management.

The influence upon *the breeding powers* differs but little from the effect on the general strength of constitution—in fact, I may say it is embodied in it. It is clear that as the strength and vigour of the body is maintained, so also is the power of transmitting it. As we preserve a strong constitution, so we keep near to the original standard, which is furnished with the most perfect provision for the perpetuation of the species. As we produce our improved domesticated breeds, so we introduce elements of weakness which are manifest in the reproduction of their successors. Hence among *very high-bred sheep*, from the weakness of this part of the system, there is less power of conception: abortion is comparatively frequent, the nourishment conveyed to the lamb both before and after birth is small, and the result is an enfeebled and delicate produce, well adapted for a luxurious mode of life, but utterly unable to contend with difficulties, such as more hardy breeds can surmount.

WOOL.

This is a valuable portion of the returns from a well-managed flock, and requires notice in this place. The skin of sheep consists of three layers: the outer one is named the cuticle, which is thin and insensible, and possesses numerous pores. Beneath this we have a soft gelatinous mass, in which the capillaries and nerves appear to terminate, and below this we have that collection of delicate and elastic fibres which constitute the true skin. If we examine beneath this third skin we find fatty cellular matter, and amongst it small vascular globules from which the wool grows, and having pierced the structure of the skins above, becomes developed into a good protection for the animal's comfort. The structure of wool, when seen under a powerful microscope, appears like the circlets of leaves seen upon the cones of a fir-tree. These leaves have a serrated edge, varying in degree in different wools, and those which are most prominent and irregular in form are generally characterised as being the best *felting* wools, being held together by these projecting parts. This peculiarity of structure is the cause of the excessive tendency of wool to curl, and, according to Monsieur Lafoun,* the number of curves in a given space corresponds with and therefore indicates the fineness of wool. He has prepared the following Table, which I

* 'Annales de l'Agriculture Française.'

extract. The fleeces are named as they are usually sorted in France :—

Sort.	Name.	Curves in an Inch.	Diameter of Fibre.
1	Superelecta ..	27 to 29	$\frac{1}{80}$ of an inch.
2	Electa	24 to 28	$\frac{7}{32}$ "
3	Prima	20 to 23	$\frac{3}{16}$ "
4	Secunda prima	18 to 19	$\frac{3}{16}$ "
5	Secunda	16 to 17	$\frac{3}{16}$ "
6	Tertia	14 to 15	$\frac{3}{16}$ "
7	Quarta	12 to 14	$\frac{3}{16}$ "

The fineness of wool depends upon various causes. The diameter is influenced, amongst other conditions, by the size of the aperture through which it grows, consequently any cause contracting the size of these apertures would tend to produce a smaller and finer growth of wool. Cold is very productive of this result, and sheep exposed to the severity of the winter months have the skin contracted and tightened thereby, and the result is wool of a more slender description: on the other hand, sheep exposed to the heat have the pores distended, and a larger-sized wool is produced. This variation is objectionable, and hence, if sheep are shielded from the extremes of heat and cold, the growth of wool is more even than if this precaution is neglected. We have, therefore, the means of regulating the evenness or *trueness* of the sample. Wool is also influenced by the mode of feeding, for even if the precaution named is duly observed, it will not overcome neglect in other respects: thus, for instance, any period of scarcity has a marked influence on the wool, and may be detected afterwards. The effect is to produce an *unsoundness* of wool, so that when its strength is tried it yields in these parts, and the sample consequently breaks: hence a check of this kind in the middle of the growth detracts very much from the value of the sample.

In the same way the produce of individual animals varies very considerably, according to the nourishment which the wool receives. If the sheep is kept throughout the year in a thriving condition, it is clear that the liberal supply of nourishment maintained around the roots of the wool cannot fail to feed and nourish the wool, and promote its luxuriant growth. Thus the same animal will produce very different lengths (and consequently weights) of wool, according as it may be fed well or badly. It has, however, been observed that a liberal system of feeding has a tendency to increase not only the length but also the size of the fibre, and consequently the improved management of our flocks has changed the character of our wools, and they are no longer

used for the same purposes as formerly. It was stated by Mr. Tison as far back as 1828, in his examination before the House of Lords : " In 1780, 420 lbs. of clothing-wool grown in Norfolk would produce 200 lbs. prime, whilst in 1828 it produces only 14 lbs. We are not, however, losers by this decrease in quality, for the increase of quantity abundantly compensates for the loss, and we adopt a more remunerative system as regards the production of mutton."

The *elasticity* of wool is dependent in a great degree on its tendency to curl, and both these qualities are possessed most highly by the finest qualities of wool. The *softness* of wool is very important, and so long as strength is not sacrificed thereby, this quality is never objectionable, but, on the contrary, very desirable. But softness, though generally an attendant on *fineness*, is not always so; for whilst a fine wool may be produced under neglect and bad management, these conditions are very unfavourable to the softness of wool. A liberal system of feeding and careful management, although producing a strong wool, also impart a peculiar and very desirable softness of texture. Much of this is due to the presence of the *yolk*, which is a secretion thrown off from the pores of the skin for the purpose of keeping the wool soft, pliant, and supple: it prevents it becoming harsh and induces a healthy growth. The production of good wool is very much influenced by the yolk, and if more attention were paid to this point, it would be very much to the advantage of the sheep farmer. The yolk is a soapy compound, consisting chiefly of potash and some animal oils; consequently when sheep are washed it is readily removed, and with it the impurities attached to the wool. A deficiency of yolk causes the wool to approach the character of hair, whilst its free supply gives a very desirable pliancy and softness to the wool, besides encouraging its growth. In cold and exposed climates the yolk is naturally deficient, and here we find *smearing* practised as an auxiliary.

If of late years the wool produced has not been so *fine* as formerly, at any rate we can claim great improvement as regards the *evenness* of the fleeces, and this is solely referable to the judicious selection of sheep for breeding purposes. In this manner the failing in one portion of a flock of ewes is counteracted by the use of a ram free from the fault, and with another portion of the flock we may find other defects which may be overcome by the use of a ram of different character. Thus in a few years by judgment and care, the breeder reaps a good reward in seeing his fleeces even and free from those coarse patches which so commonly follow a careless system of management.

With reference to the quantity of wool produced by different

breeds, I may refer to Mr. Lawes's observations,* before spoken of. The weights produced by the several breeds experimented on were as follows:—

	lbs.	ozs.
Cotswolds	9	4½
Leicesters	8	2½
Cross-bred ewes	7	3½
Cross-bred wethers	6	7
Hampshires	6	4
Sussex Downs	5	10

If, however, they are placed according to their percentage of wool, their position changes thus:—

	Per 100 lbs. live weight.
Leicesters	5·58
Cotswolds	5·44
Cross-bred ewes	5·4
Cross-bred wethers	4·6
Sussex Downs	4·57
Hampshires	3·77

THE DISEASES OF SHEEP.

Diseases affecting the Head.—*Giddiness.* Symptoms.—The sheep becomes dull and sluggish in its movements; the functions of the body are devoid of energy; it walks with a staggering gait, and as the disease progresses the sheep holds its head towards one side and gradually commences *turning*. Ultimately the sheep wastes away and dies. This will not be mistaken for inflammation of the brain, for in such a case there is great energy of body shown; here, however, it is exactly the reverse.

Treatment.—A skilful veterinary surgeon may be successful in the removal of the hydatid, by cutting out a portion of the skull immediately over the hydatid; but with persons unaccustomed to such operations the chance of success is very small. The better plan is to fatten the sheep as soon as first observed, and with as little loss of time as possible.

Cause.—This disease arises from the presence of the *cænuris cerebrealis*, which probably gains access to the brain from ova intermixed with the food, which circulating through the system, attach themselves to the brain as a natural habitat.†

* 'Journal of Royal Agricultural Society,' vol. xvi. p. 76.

† The results of an important investigation with regard to this disease have been published in 'The Edinburgh Veterinary Review,' of January, 1859, by Professor Gamgee. In this article he shows that it may be traced to the use of dogs with sheep. He says: "Many intelligent farmers have a great dislike to dogs amongst sheep, in the belief that by being worried the sheep became affected with sturdy," or giddiness. He then proceeds to show that this is not the cause. "Sturdy will always be found to prevail on farms with open pastures, where flocks constantly need the guardianship of shepherds and dogs, or on enclosed farms

Prevention.—A more liberal system of feeding and careful management, especially in the winter and early spring.

Water in the Head.—**Symptoms.**—An enlargement of the forehead, heavy and inactive manner, and a disposition to stagger in walking; but the animal does not turn round.

Treatment.—Highly nutritious food, especially rich milk, and preparation for the butcher with as much speed as possible.

Cause.—Hereditary disposition, combined with poor food of a watery character in exposed situations.

Prevention.—Avoid breeding from the parent (the general stock will indicate whether it is the ram or the ewe), and in consuming common turnips and similar food of inferior quality in bleak and exposed situations: give the flock some hay or dry fodder.

Apoplexy or Blood Stroke.—The warning symptoms are dullness and general inactivity, extending alike to the movements of the sheep and the rumination. Subsequently the sheep staggers and dies suddenly.

Treatment.—This, to be successful, must be in the *early* stage. A pint of blood should be taken from the jugular or neck vein, and 4 ounces of Epsom salts given as promptly as possible, and the salts repeated in doses of 1 ounce each, every 5 or 6 hours until the bowels are well purged. If the sheep is saved for 3 or 4 hours the greatest danger is past. If the breathing and pulse are strong after the second hour, bleed again (say half a pint). Water gruel must be the diet for several days, with half an ounce of spirits of nitre daily until the fever abates.

Cause.—The tendency to a production of fat so eminently possessed by our best bred flocks renders them especially liable to these attacks, which are produced by the system being overcharged with highly nutritious blood: this, from the heat of the sun, or some other exciting cause, is poured upon the brain and causes death, unless prompt measures are taken in the early stage.

Prevention.—Always take warning by the first loss, and remove the flock to pasturage of rather inferior quality, and should they

where sheep are fed on turnips, confined within limited space, *with one or more dogs amongst them*. These are the conditions favourable to the development of sturdy; they are those favourable to the dissemination of tapeworm eggs by dogs, and the penetration of the eggs into the bodies of sheep. These eggs find a favourable *nidus* in the cerebral mass of the lamb, and from them is developed the *Cœnurus cerebralis*. . . . The *Cœnurus cerebralis* was discovered by Küchenmeister to be the cystic stage, or bladder form of one of the tapeworms met with in the dog's intestines." A number of experiments are then given proving that dogs fed on the brains of sheep affected with *Cœnurus cerebralis* became affected with tapeworms, and these when given to healthy sheep produced sturdy or giddiness. The article is worthy of perusal by any one taking an interest in this disease, and it certainly confirms the conviction previously entertained by some farmers that the use of dogs was the indirect cause.

be in high condition, give to each $\frac{1}{2}$ lb. Epsom salts. If the blood of the first sheep from the early bleeding should be thick, and of a deep red, it will be desirable to examine the flock, and if any similar tendency is shown by others, it would be better to resort to bleeding.

Inflammation of the Brain.—Symptoms.—The sheep having for a short time appeared heavy and disinclined to move, suddenly rises and runs about regardless of danger or obstacles, with its eyes red and protruding.

Treatment.—As soon as possible, the sheep should be secured and bled from the neck vein as freely as almost to produce fainting. Give also 4 ounces of Epsom salts, and repeat in two hours, if needed, and keep up a strong purging by 1 ounce doses every 6 or 8 hours after, until the inflammation abates. After the second or third day, give spirit of nitre $\frac{1}{2}$ ounce, gentian 2 or 3 drachms daily, and feed on gruel and branmashes.

The cause and prevention the same as in apoplexy.

THE DISEASES AFFECTING THE ORGANS OF DIGESTION.

Distention of the Rumen or Hoove.—Symptoms.—The rumination ceases, the breathing becomes difficult and painful. The left flank is swollen and hard.

Treatment.—Give one ounce of spirits of hartshorn in one pint of water, or else one dram chloride of lime dissolved in one pint of water. This will form a chemical combination with the gas accumulated in the rumen, and the result will be a return to its original size. Should neither of these be at hand, a knife may be plunged into the stomach, a short distance below the chine. An instrument called the trocar is far better, as it is more safely used, and the aperture is kept open subsequently as long as may be desirable. Having removed the pressure of gas, the cause must also be removed, and this will be accomplished by using 4 to 6 ounces of linseed oil, $\frac{1}{2}$ ounce mustard in one pint of thin gruel, or linseed tea. Should this fail to move the bowels, $\frac{1}{2}$ pound of Epsom salts may be given, and the sheep should have gentle exercise, which will favour the action of the purgative. The sheep should be watched for some days, and constipation of the bowels should be avoided by giving small doses of Epsom salts—say one ounce daily.

Cause.—An unhealthy state of the rumen is the primary cause in many cases, from the liquid secreted by the coats of the stomach being of an acid instead of an alkaline character, or from a want of energy in the muscles of the rumen, whereby the movement of the food is retarded, or else from the food being of an improper character. In either case a decomposition of the

food takes place, and gases are evolved which accumulate in the rumen, and cause distension. Hence, in the treatment, we must first remove the pressure of these gases, and then by purgatives bring the stomach into a more healthy state.

Prevention.—When the stock are first put upon succulent food, prevent them overloading the rumen in their greediness for the new food. This may be done, after they have had a moderate supply, by removing them to another field having barer keep. It may often be prevented by avoiding improper food.

Rot in the Liver.—Symptoms.—Loss of appetite, paleness of the membranes. The bright red colour of the eye gradually goes; swellings appear under the throat and on other parts of the body, the flesh loses its firmness, and the sheep gradually wastes away and dies.

Treatment.—Feed for the butcher as rapidly as possible, give iodide of iron 5 grains, and spirits of turpentine $\frac{1}{2}$ ounce twice daily, and let the sheep have access to salt.

Cause.—Certain tracts of land are noted for producing this disease, and it is believed that amongst the herbage of such land the germs of a parasitical animal are found by the sheep. In feeding upon this grass, these germs pass into the system and attach themselves to the liver, where they ultimately become developed into flukes. As these parasites increase in strength and number, so the liver becomes destroyed by them, and is therefore unable to perform its functions. In the early stages this diminished action of the liver gives a tendency to fatten, and sheep sold within 10 or 12 weeks of the time the rot commences are really improved thereby, but after this period the liver becomes so reduced as not to maintain health in the body, and the sheep gradually wastes away.

Prevention.—Avoid ground which communicates the rot, and give sheep a free supply of rock salt, except when breeding and in milk.

Red Water.—Symptoms.—Occasionally swellings may be detected under the cheek and on the legs, together with a dropsical enlargement of the stomach, but generally little or no warning is given until the sheep is found dead in the field, and upon being opened a quantity of *red water* is found in the belly.

Treatment.—Mild purgatives combined with a tonic is the general treatment, and for this purpose 1 ounce of Epsom salts, 2 drachms of gentian, 6 grains of fox-glove, and 4 grains of iodide of iron may be given daily. Dry and nourishing food should be liberally administered.

Cause.—The sheep from lying on wet and exposed situations, especially when upon poor food, get an inflammation in the coats

of the stomach nearest the ground, whereby an excessive quantity of liquid is secreted and accumulated there.

Prevention.—Liberal supplies of food, a dry resting-place, and the use of rock salt.

Diarrhœa.—Symptoms.—Very loose state of the bowels, often accompanied with pain but very little fever.

Treatment.—The use of the following mixture I have found successful:—

Catechu	1½ ounce.
Spirits of wine	1½ „
Laudanum	2 ounces.
Essence of ginger	½ ounce.
Water	1 pint.

Dose for sheep ½ to 1 ounce.

„ lambs 1 drachm to 4 drachms.

To be given two or three times daily, according to circumstances.

Cause.—Sudden change of food, and general inflammation of the mucous membrane of the bowels.

Dysentery.—Symptoms.—The excrement is of a watery and fetid character, with a discharge of mucous matter and blood.

Treatment.—Linseed oil, 3 ounces; powdered opium, 4 grains, with some thick gruel to be given twice in the first day, and afterwards give a full dose of the diarrhœa mixture above, together with ½ drachm of gentian divided into the doses of the day.

Cause.—This is caused by an inflammation of the inner coats of the stomach, to which it has spread from the mucous membrane. It is, therefore, an advanced stage of diarrhœa. It is frequently produced by a sudden change from succulent to very dry food.

Prevention.—Prompt attention to the early appearance of diarrhœa, and a careful regard to the supply of food—neither allowing the system to be suddenly overcharged with juicy food after it has been accustomed to dry and short keep, nor having recourse suddenly from green food or good meadow land to dry hilly pasturage.

Diarrhœa and dysentery are occasionally produced by worms in the stomach and intestines, which have been taken in with the food and have located themselves there. In this manner irritation is produced, then inflammation of the mucous membrane and its attendant diarrhœa, and finally the further stage of dysentery and death. This cause is seldom detected until after death. If, therefore, ordinary treatment fails, or should proof be obtained of the presence of worms, then the following medicine may be adopted:—

Iodide of iron	10 grains.
Laudanum	1 ounce.
Water	1 „

Spirits of turpentine	2 ounces.
Essence of ginger	$\frac{1}{2}$ ounce.
Linseed oil	2 ounces.
Dose for sheep	1 oz. to $1\frac{1}{2}$ oz.
„ lambs	$\frac{1}{2}$ oz. to $\frac{1}{4}$ oz.

To be given once daily, for three or four days; then give the diarrhoea mixture (named above) for three or four days; and, if necessary, repeat this treatment for another six or eight days. Nutritious, dry, and digestible food is desirable.

Constipation.—Symptoms.—The excrement becomes hard, and is voided with difficulty and after long intervals.

Treatment.—Give 3 or 4 ounces of Epsom salts with $\frac{1}{2}$ drachm of ginger. This will generally stimulate the bowels to action; if not, repeat, in three or four hours, Epsom salts 4 ounces, and mustard $\frac{1}{2}$ ounce. Should the bowels prove obstinate, change the purgative and give linseed oil 4 ounces; if still no action after four or five hours, repeat linseed oil 4 ounces and mustard $\frac{1}{2}$ ounce. Warm and thin gruel given freely, together with gentle friction, will promote the action of the medicine.

Cause.—Dry herbage—free use of hay and corn—also inflammatory action induced in the coats of the stomach by irritating and indigestible food.

DISEASES OF THE ORGANS OF RESPIRATION.

Catarrh.—Symptoms.—The sheep coughs, often with manifest pain and generally a discharge from the nose.

Treatment.—Give Nitre 1 drachm.
Ginger 1
Tartarised Antimony $\frac{1}{2}$ „

In some gruel, daily.

Cause.—Inflammatory action in the membrane of the nasal organs and throat—from sudden and severe changes in the temperature.

Prevention.—This not always available, and chiefly consists in giving shelter by removing the flock to another field or to the yards.

Inflammation of the Lungs.—Symptoms.—Increased pulse—rapid breathing—rumination very slow, and seldom performed—loss of appetite—painful cough; and as the disease progresses, the brightness of the eye is lost—the sheep staggers in its walk, and gradually sinks under the attack.

Treatment.—Bleed freely from the neck vein—if a strong sheep 1 or $1\frac{1}{2}$ pint. This should be followed by strong purgatives to act on the bowels. If the fever continues, the bleeding must be repeated and carried as far as nearly to produce faint-

ness. If the sheep will not feed, drench with gruel. The following medicine will be found valuable as an assistant in reducing the fever :—

Linseed oil	..	..	..	..	..	1 pint.
Camphor	..	..	..	..	..	10 drachms.
Nitre	..	..	..	..	..	10 „
Emetic tartar	..	..	..	..	..	7 „
Digitalis	..	..	..	..	..	7 „

Dose from $\frac{1}{4}$ to 1 ounce.

The bowels must be watched : if too much purged give the diarrhoea mixture ; if constipated give salts ; but of the two, avoid constipation. If two setons are inserted in the breast they will be beneficial.

Cause.—Neglect of coughs before inflammation is communicated to the lungs ; chills and colds in general.

Prevention.—Avoid excessive driving of sheep, or any other proceeding whereby they get the blood heated, and when lying upon cold and exposed land get inflammation.

Secure as much as *possible* dry land for the sheep during the night.

DISEASES OF THE ORGANS OF CIRCULATION.

Fever.—Symptoms.—The heart beats high—the pulse is quick—great thirst—general lassitude and reluctance to move, without any part of the body being particularly affected—loss of appetite, and the sheep separates from the flock.

Treatment.—Saline purgatives, combined with medicines for lowering the action of the heart, such as the following—

Nitre	..	..	..	..	..	1 drachm.
Tartar emetic	..	..	..	..	..	1 scruple.
Digitalis	..	..	..	..	..	1 „

to be given daily, and Epsom salts sufficient to purge. Prompt measures are desirable.

Cause.—A rapidly increased circulation, stimulated by the animal having taken cold from wet or exposure. In its present stage it has not settled upon any particular part of the body, and early attention may prevent its doing so.

Prevention.—Little can be done in this way, except by avoiding as much as possible unnecessary exposure in bleak and damp situations.

DISEASES OF THE ORGANS OF LOCOMOTION.

Foot-Rot.—Symptoms.—Lameness and excessive tenderness of

the foot, often causing the sheep to go down upon their knees whilst feeding.

Treatment.—Pare the foot well, and wherever there may be any tenderness of feeling under the hoof, which is readily detected by sharply pressing with the nail, it must be cut away until the operator is assured that over the whole of the foot there is a firm attachment between the sensible and insensible portions. Hesitation is here fatal to success; for where any suppuration exists there will matter be found, and unless exposed and corrected, it must break out again on some future occasion. The sore being thus exposed, some caustic must be applied to destroy the matter and produce a healthy surface. For this purpose various materials are employed. Butter of antimony, strong acids, &c., have been used. I always use finely powdered blue-stone, which is carefully sprinkled over the surface laid bare by the paring. The foot is then freely dressed with tar, and the sheep put upon a floor covered with recently crumbled quick-lime. Here they remain for two or three hours, and are then turned into a dry yard for the night. This I have found a successful mode of procedure.

Cause.—Upon this point there is considerable doubt. Many attribute it to the softening influence of damp and marshy soils; but I believe the true cause has yet to be discovered, although I am free to admit that it exists and operates powerfully when the sheep are on damp land. I have recently been very much struck with the fact that lands equally moist are rendered less injurious by the use of lime as a manure. So much so, that I have seen adjoining farms in many places, which are subject to the rot in proportion as the farmers have been in the habit of drawing lime. I do not presume to say that the prevalence of foot-rot is in every case to be traced to this influence, but a careful observation leads me to believe that there is a connection between them. I very recently observed a singular case bearing upon this point, in which only one field on a farm was free from the rot; no apparent difference could be detected further than a heap of lime which had been a sporting place for the sheep. Upon and around this place they constantly played; but as soon as this was worn down the field became as bad as any other on the farm.

V.—*On Carts and Waggon.* By T. W. P. ISAAC, of Northgate-street, Bath; and EDWARD SPENDER, of Mannamead, Plymouth.

PRIZE ESSAY.

I.—THE RESPECTIVE ADVANTAGES AND DISADVANTAGES OF
CARTS AND WAGGONS.

WHILE great attention is now being directed towards the science of agriculture, such as is involved in a knowledge of soils, manures, &c., the mechanics of agriculture should not be forgotten. And here we refer not to such important branches as steam-ploughs, reaping-machines, &c., which are in no danger of being overlooked, but to such less particulars as those vehicles which the farmer makes use of every day. He may employ the best manures, and apply his steam-power in the most efficient manner, and yet every time that his horses draw the former into the field, or carry fuel for the latter, there may be a loss of strength, and consequently a waste of money. At present there is little likelihood that the cart or waggon will be superseded by steam. It is well then to consider the various kinds of these vehicles with a view of deciding upon that which can be used with the greatest economy. It is calculated by Mr. Morton, in his 'Cyclopædia of Agriculture,' that full one-half of the horse labour on a farm is that of carriage (p. 400). The efficacy of the machines employed in this labour is thus, as Mr. Morton remarks, of great moment; and their construction, so as to facilitate the accomplishment of their purposes, seems to be one of the most important questions in agricultural mechanics. Inasmuch as a large portion of this carriage is field-work, the "strength and make" of the implement plainly ought to be accommodated to the circumstances of rough roads and soft ground rather than to those of the turnpike road. The evidence which has been offered by various persons interested in this matter, as to the best kind of carriage, is, as far as we know, unanimously in favour of the one-horse cart. Not only is its first cost less than that of the waggon, but it will also carry more in proportion to its size. Mr. Loomes, in the sixth volume of the Royal Agricultural Society's Journal, says, that the one-horse cart carries far more than half the load of the two-horse waggon: thus—

A one-horse cart will carry—

Wheat-sheaves, 172.
Corn-cake, &c., 25 cwt.
Bones, 60 bushels.

A two-horse waggon will carry—

Wheat-sheaves, 207.
Corn-cake, &c., 45 cwt.
Bones, 100 bushels.

He asserts even that for harvest and manure-work four one-horse carts are fully equal to four two-horse waggons, with the additional advantage that the former are not so liable to poach the land when it is wet, while the labour of the four horses thus saved enables the farmer to plough in the manure as soon as laid on the land. And though it requires one person to every 25 cwt. with a cart, and one to only 45 cwt. with a waggon, the latter is not really less economical, since a boy at 8*d.* per day is as capable of managing one horse as a man of driving two horses.

Mr. Love, in the Royal Agricultural Society's Journal, vol. xii., argues no less strongly in favour of carts. They are more useful for all kinds of work. Thus in hauling farmyard manure, the quantity which a one-horse cart will hold is about one solid yard, which will measure $1\frac{1}{2}$ yard when thrown into the cart, and weigh 16 to 20 cwt. This, with the weight of the cart (6 cwt.), would make about 24 cwt. for one horse. A two-horse cart or waggon will hold $1\frac{1}{2}$ yard of dung, and this, with the weight of the waggon (12 cwt.), equals about 1 ton per horse. There is clearly a loss of labour here, since three one-horse carts will draw nearly as much as two two-horse waggons—*i. e.* a loss of one horse in four, which is equivalent to 1*s.* per yard. From this deduct the extra driver, who need be nothing more than a boy at 6*d.* or 10*d.* per day, and the result is 10*d.* per load, or one-fourth in favour of the one-horse cart. In hay-harvest the result is similar. A cart 12 ft. long by 6 ft. wide, standing 3 ft. from the ground, and with a load about $10\frac{1}{2}$ ft. from the ground, will have 20 cubic yards of hay upon it, weighing 16 to 20 cwt., which, with the weight of the cart, makes a fair load of 25 cwt. for the horse. Waggons when loaded weigh 48 cwt., half of which is the weight of the waggon. Therefore, in waggons requiring two horses, each horse draws only $12\frac{1}{2}$ cwt. hay, although drawing the same gross weight as the horse in the cart, who can carry 18 cwt. hay. So that four horses with two waggons would carry 50 cwt. hay; while three horses with carts would bring 54 cwt. hay, the total loads being 75 cwt.; while the total gross waggon-load is 96 cwt., or 24 cwt. per horse, or only 1 cwt. less than the total drawn by the one horse in the cart, so that we save one-fourth of the horse labour. Again, in hauling lime, three men with six horses and carts will carry 7 tons lime; and adding 2 tons for the carts = 9 tons, or 30 cwt. per horse; the expenses of six horses at 3*s.* per horse = 18*s.*, and three men at 2*s.* = 6*s.* = 24*s.*, = 3*s.* 6*d.* per ton. With two waggons the same weight might be brought, but it seldom is. Two waggons weigh nearly three tons. Then eight

horses at 3*s.* = 24*s.*, and two men at 2*s.* = 4*s.*, altogether 28*s.*, or 4*s.* per ton, or one-eighth in favour of carts, without counting the extra turnpikes for waggons. There is a further disadvantage in waggons, the difficulty of loading and unloading. The only superiority to which they pretend, the facility for dragging when going down hill, no longer exists, since Mr. Love has invented a drag for carts. In carrying the wheat-harvest, the use of carts gives a saving of about one-seventh both of horse and man labour. In carting roots the same arguments may be used as those mentioned when speaking of the carting of manure. A saving of one-fourth is effected by carts. In marketing corn most of what was said with regard to the hauling of lime will apply. Carts will afford a saving of one-fourth, and a loss of one-eighth, or a clear gain of one-eighth.

There are other advantages to be urged in favour of carts. For instance, in loading with manure, or with wheat, hay, lime, any increase in the height of the vehicle involves a proportionate increase of labour and time. In the case of hay and straw the loss is counterbalanced by the gain in unloading; in the other cases a greater height is a clear disadvantage. There is this further reason why waggons should be superseded: the wheels of a cart may be used for various bodies; and thus an even frame-work for the carriage of straw, or a shafted box for the conveyance of earth, manure, or roots, may be used at pleasure.

"Probably," says Mr. Morton, "no arrangement of circumstances better adapted for the general nature of farm-carriage exists than where one pair of wheels is used sometimes with the common Scotch 'body,' which will hold a ton weight of stones or of earth level with the edge of its sides, or of roots or dung when heaped; or at others, when required for harvest-work or the conveyance of straw, with framework 'wings,' or Robertson's 'body,' on which a ton weight may easily be built without requiring a very great height of load." But, as we have stated, the farmer not only gains pecuniarily every time that he uses the cart instead of the waggon, but in the original purchase of his vehicles he makes a very considerable profit.

Mr. Loomes supposes the case of a farm requiring the following items:—

	£.
2 waggons at 30 <i>l.</i>	60
2 harvest waggons at 15 <i>l.</i>	30
4 carts at 12 <i>l.</i>	48
	138

By using one-horse carts with fittings for harvest-work, the

outlay will be, four carts complete at 13*l.* = 52*l.*, whereby a saving of 86*l.* is effected. Moreover, a shed for sheltering the waggons would cost 70*l.*; a shed for the carts would cost only 35*l.*, making a total saving of 121*l.* There are various other minor considerations which all lead to the same result. Carts are less destructive to roads than waggons, more especially in hilly country, where it is necessary to lock the wheels of the latter. Two horses in carts may be led alternate sides of the road, so that it shall be worn evenly. Two horses in a waggon must continue in a uniform direction, and the consequence is clearly visible in deep ruts. One horse can more easily recover himself when alone than when with another horse. Moreover, it should be remembered, that when we speak of two horses drawing a certain load, and one horse drawing another load, in the latter case the element of calculation is practically and actually correct. In the former it is only theoretically that we can affirm, of two horses drawing 48 cwt., that each horse draws 24 cwt. It is rare indeed to see two horses so well matched that each should do his own work exactly. In spite of the driver's whip, it is a general rule that the largest beast manages to shirk its duties. One very obvious advantage gained by using carts occurs in unloading. In loading a waggon, if the man on one side has the wind or the rising ground in his favour, the man on the other side has a corresponding disadvantage. But the single man pitching upon a cart may turn it about as suits him best; in fact, in many sorts of work it is absolutely necessary to use a cart that will tip. Although waggons have been manufactured to tip, and the ingenuity of Mr. Milford, of Thaverton, has contrived a tipping waggon so simple as to involve little risk of getting out of order, or of unsteadiness, or of insecurity, yet it is evident waggons are not so well adapted as carts to discharge loads by tipping. Moreover, carts are of course lighter than waggons, and therefore not so liable to plough up the land when in a field; carts will more easily turn the corners of narrow lanes, and pass through narrow gateways, whereby sundry scratches and bruises are spared. Lastly, the turnpike tolls are less for carts than for waggons, which in some parts of the kingdom, such as North Wales, is a matter of importance.*

* The writer of the essay, in opening his case for his plaintiff, "the cart," has not stated the arguments urged in favour of the defendant, "the waggon," which it would have been better to have done, even for the purpose of refuting them. When, however, he calls witnesses on another point, at the close of his case, it will need no cross-questioning to render evident the strong leaning of practical men in favour of the waggon. One of the objects of the prize was to elicit the ground on which their practical judgment rests, for the purpose of fairly discussing its real value.—Ed.

II.—THE MOST IMPORTANT POINTS TO BE ATTENDED TO IN THEIR CONSTRUCTION.

We will now proceed to notice a few of the most important points to be attended to in the construction of carts and waggons. In doing this we do not pretend to explain all the details, so as to enable the farmer to be his own wheelwright; we only wish to draw his attention to a few points which may assist him in choosing the best kind of waggon or cart. One remark applies equally to waggons, carts, and other agricultural implements—strength, durability, lightness, and economy should be the object of every manufacturer. With this view all needless ornament and panelling should be avoided, since these increase the cost without adding to the usefulness. Projections (which will retain wet), mortices, and nails should be as few as possible. The bed of the cart or waggon should be as low as possible, since this arrangement lessens the labour of filling and the danger of upsetting. It should be remembered that in moving weights the height to which they are raised is a most important item in the cost. Hence the advantage of a low cart, such as Stratton's Northampton cart. If the nails and iron used in carts and waggons were galvanised, so as to prevent rust, it would be a great improvement. The height and construction of the wheels are points requiring attention. These should be such as to secure the easiest draught, consistent with strength, for the horse.

We shall in the following remarks confine our attention principally to carts, since we believe they are for all the purposes of the farm superior to waggons. Carts, though the different varieties are legion, may be classed under two principal kinds—the tilt or coup close-bodied cart, and the close-bodied dormant-cart. A third and less important kind is the corn or hay-cart, used principally in the seasons of hay and corn harvest. Of these by far the most important are the tilt-carts. These are employed on most of the farm operations—to convey manure, stone, turnips, potatoes, and such loads as may safely be emptied by tilting. It is obvious for all these purposes tilt-carts are greatly superior to the dormant-bodied carriage, where the shafts are fastened to the bed of the cart, and the contents cannot be taken out except piecemeal, or by taking the horse out so as to allow the shafts to be lifted. The dormant-cart, on the other hand, is well adapted for the conveyance of grain in bags, and such articles as require to be removed from the cart by lifting, since it affords a firmer surface for the load. Of the harvest-cart there are several varieties, all resembling each other in presenting a large surface on which to load the corn, with a low

centre of gravity so as to obtain greater steadiness. Of these perhaps the best is that known as Robertson's harvest-cart.

It is, as before stated, the best economy to make the same pair of wheels serve for the harvest as well as the ordinary body; and in Busby and Fry's carts the harvest-raves are so contrived as to do this with safety; but of this we shall speak hereafter. It is of course important to arrange the load so as to husband the energies of the horse. Experience has shown that this is best accomplished when the body is so placed that four-sevenths are before, and three-sevenths behind, the axle. It has been urged as an objection to the use of carts, and as an argument in favour of waggon, that in going down hill the weight is thrown on the back of the horse: this objection, we believe, is much overrated; for the load may be so arranged by means of the tilt as to balance.

In carts of all descriptions the boarding of the floor and sides is a point deserving considerable attention. Very fine and straight-grained deal should be avoided as liable to split. Well-seasoned elm or ash is perhaps as well adapted for this purpose as any timber.

The nails used for fixing the boarding should be the common cart nails, the short length, increased thickness, and chisel point of which are well adapted for being driven into hard wood, whilst their thickness enables them to bear the rough usage to which these machines are liable.

We will now notice in order the various portions of the cart, and give our views on each as we proceed. We shall refer—

- 1st. To the wheels.
- 2nd. To the axle and mode of attachment.
- 3rd. To the tilt.
- 4th. To the height of cart and position of shafts.

1st. *The Wheels.*

The box or nave is perhaps the most important part of the wheel, since it in a great measure determines the friction and consequent draught of the load. The box is either of wood or of iron; if of wood, elm is generally employed. There can be no question that iron forms a less bulky and more durable nave than wood. The use of iron for the nave increases the cost, according to the size of the cart, from 1*l.* to 2*l.*

The arm of the axle is not of a simply conical shape; it has a depression turned upon its surface, in which the oil will remain, and a cap is bolted on which is kept full of oil by an oil-hole fitted by a screw, so that the interior rarely needs examination. Should it require cleaning, these bolts must be undone, and then not only ..

the cap but that part of the box in which the spokes are mortised will come off. This latter part of the nave of the wheel slips on and off the collar which carries the axle, but does not revolve on it, being prevented from that by three longitudinal ridges projecting from the latter, which fit corresponding furrows in itself; when that is removed the linchpin is taken out, and a collar, through which as well as through the end of the axle-arm it passes, is removed, and then the inner part of the nave or box may be slipped off and examined. The increased cost of these patent axles over the ordinary ones is 1*l.* 5*s.*

Mr. Stephens, in his 'Book of the Farm,' vol. i. page 432, suggests that the grease used for railway carriages, which has a mixture of sulphur in it, might be advantageously applied to carts.

The spokes are either of well-seasoned oak, as in Crosskill's patent wheel, or of box iron, as in Stratton's iron wheel. We ourselves prefer oak spokes to iron; they are easier and cheaper to repair. The dish of the wheel is of considerable importance.

Mr. Thompson, in the 'Royal Agricultural Society's Journal,' vol. vi. page 611, has so ably and at the same time so clearly explained the nature of and necessity for dishing the whole, that we take the liberty of quoting his remarks:—

"Form of Wheels.—A perfectly flat wheel, or, technically speaking, a wheel which is not dished, is the strongest whilst the cart is standing still or moving on a perfectly level road, or, to speak more correctly, is the strongest so long as the cart preserves its horizontal position, because under such circumstances there can be no lateral pressure, and each spoke, as it in turn receives the weight of the cart, receives it in a perpendicular position, in which, of course, it is capable of supporting the greatest weight. But in practice carts do not remain stationary, nor are roads accurately smooth and level, and no one can watch a cart travelling on even the best of roads without observing that one wheel or the other is continually rising over a slight elevation or sinking into a trifling hollow, and consequently that the cart never preserves a perfectly horizontal position for even a few yards at a time.

"This is strictly true of a good turnpike-road, but it applies with much more force to farmwork, in the course of which carts have to cross ridge and furrow at all angles, and to travel on roads having ruts and holes of all sorts and sizes. It may, therefore, be assumed that a cart, when in motion, never long retains its horizontal position; and this is a point of the greatest importance, because at each change of level the wheel which is lowest receives more than its share of the load, and this additional weight is thrown upon it in a way which causes more strain upon the wheel than if a much greater weight were merely placed in the cart, because when one wheel sinks the whole load gives a lurch sideways, and, in descending into a deep hole or rut, acquires a certain velocity which at the bottom is brought to a sudden stop, and thus exerts upon the wheel on that side a force which partakes of the nature of impact. It thus appears that, in addition to the vertical pressure produced by the weight of the load, a wheel is subjected to a succession of sidethrusts applied to the axle but resisted at the circumference or rim, which at the instant of any particular thrust may be considered stationary, and is so in point of fact with reference to any lateral pressure. Having thus determined the nature

and direction of the forces which a wheel is required to resist, it will be comparatively easy to determine its proper form. If a wheel be flat, the outward thrust above described is only resisted by the strength of the joints by which the spokes are fixed into the felloes and nave. It is true that in the wheels of this make these joints are square, and can be made truer and better fitted than those of any other shape; but however good the joints, it is impossible for them to stand long when taken at so great a disadvantage. The joints, in the felloes especially, have the whole leverage of the spoke acting to force them out of their place; the rim resting on the ground is the fulcrum, the side thrust at the axle is the power which is here applied at right angles to the spoke which forms the lever, so that this lateral pressure acts at a great mechanical advantage in forcing the joints, and must soon destroy the wheel if put to rough work. However, the wheels be dished, the case is materially altered, as the outward thrust, which has a tendency to flatten the wheel, is resisted by the convex arrangement of the spokes, which imparts to it in some measure the strength of an arch, and the wheel cannot give way in this direction unless the material of the tire be forced asunder. It ought, therefore, to be considered an established rule in cartbuilding that, unless for some special object, wheels should be moderately dished; if carried to excess, however, the wheels will be liable, from the slanting position of the spokes, to bear without injury the critical pressure of the load. This may be obviated by using bent axles and making the lower part of the wheel perpendicular, whilst the upper part leans outwards; but there are many objections to this plan, and it is not at all required if the dishing be not extreme: $1\frac{1}{4}$ inch is found to answer well, and could not be much exceeded."

2nd. *The Axle.*

This is constructed either of wood or iron; if of wood, its weight is probably about 50 lbs.; if of iron, 70 lbs. Iron is doubtless better adapted than wood for this purpose.

Axles are generally straight, though some machine-makers have them bent so as to keep the load low; but the increase of weight and cost is a serious objection to this plan.

The mode of construction usually employed by country wheelwrights in the form of the axle, position of the wheels, and shape of the rim, is extremely faulty. The wheels are generally dished to an unnecessary extent, the axle bent downwards, and the rim of the wheel conical, the outer side forming a smaller circle than the inner. The conical nature of the rim is consequent on the undue dishing of the wheels and bend of the axle, for, were it not so, the wheel would run only on its outer edge. Now, the conical nature of the rim increases the draught very considerably. If a perfect cone on its side were set in motion by a force applied at its base, it would describe a circle of which its vertex would form the centre. The tendency of conical wheels is in like manner to describe a circle outward from the cart, and thus increase the friction of the axles, the pressure on the linchpin, and the draught on the horse. Wheelwrights, to overcome this, place the wheels nearer in front than behind, or, as they term it, make them look outwards. This, however, is but remedying one fault by the com-

mission of another; the sounder policy is so to place the wheels as to do away with the necessity of a conical rim.

A further evil resulting from this mode of construction is the uneven jerking motion from side to side of the cart. This arises from the axle being bent, and the bush consequently made sloping to fit it. A lateral as well as vertical pressure is thus produced, from which arises the uneven motion. To remedy these evils the axle should be made nearly straight and the wheels nearly upright. Perhaps it may be as well to slightly round the tire, since it does not squeeze the land so much as when flat.* It is not well to have the axle *perfectly* straight, since for convenience of greasing they are always made to taper, and, were they put straight, the same evils as before described would arise from the sloping bush. It is best, therefore, to give the axle a slight bend downwards equal to the amount of the taper, so as to make its under side horizontal.

3rd. *The Tilt.*

The cart-body is either dormant or has a tilt. It is evident that a tilt-cart is superior to the dormant-bodied cart, inasmuch as its load can be at once emptied, which operation in the latter can only be accomplished piecemeal, or by the removal of the horse from the shafts. When the cart-body is movable independently of the shafts, one of two plans is adopted: either that resorted to in the case of the Northampton cart, where the body rests upon the axle and the shafts are fastened directly upon the axle also, or as in the Scotch cart, where the shafts are fastened not to the axle, but to a spindle which passes through the side-pieces of the framework on which the bed is nailed, and through the hinder extremities of the shafts themselves. In this case, when the body tilts, it turns around the cart axle; and as the shafts are attached to the bed in front of the axle, the forward motion of the horse, after the load has fallen, obviously tends to bring the body to its place again, without the assistance of the carter.

The mode adopted by Crosskill of attaching the front of the cart to the shaft is simple and effective. A piece of iron pierced with holes is fixed to the body of the cart; into these a bolt fits, kept in its place by a lever. It is obvious that according to the height of the hole in which the bolt is placed will be the position of the bed of the cart, whether dormant on the shafts or with its bed sloped to any required angle. A second method is that of the Scotch tilt cart. There are two straps of iron, the one

* There is a still better plan, viz., to make a portion of the tire flat, and to bevil the rest. The flat part alone rests on the hard road; the bevilled part comes into bearing on soft ground. So on hard ground friction is diminished; and on soft ground there is less sinking, and less cutting of turf.—Ed.

hinged on to the shaft crosspiece, and carrying a bolt which fits into the holes pierced in the other, which is fastened to the body of the cart; a collar slips over the two when they are thus bolted together, and holds them so. A third method is that adopted by Messrs. Fowler and Fry in their Newport prize cart. The method and its use are now well known: a bar is hinged to the shaft crosspiece and carries a collar through which the looped iron attached to the cart passes, and is held by the pin in any required position. This plan is very similar to Stratton's tilting apparatus. A fourth method is by means of a rack pinion and small winch, with the rackwork boxed. This plan is expensive and liable to get out of order. Still this kind of tilt is useful on hilly ground. A boy is generally employed to go with a cart, and his strength is frequently not sufficient to raise the cart so as to tilt and preserve the proper level in descending hills; now, by means of the winch, the boy is able to easily accomplish this.

4th. The height of the Cart and position of Shafts.

We have already stated our opinion to be in favour of low carts, inasmuch as they are steadier and easier to fill. Still there are some arguments to be urged in favour of high carts. To apply the force of the horse most economically the shafts should be of such a height that when the horse is drawing the shoulder-chain and shaft shall be in one straight line. In fact the axle of the cart or centre of the weight should form a straight line with the shoulder-chain of the horse, or the point at which the power is applied. If the shaft be too high or too low the chain will meet at an angle and cause a waste of power. It is therefore clear on good level roads the horse draws his load with the greatest ease when the shafts are nearly level. But in ascending a hill, or on rough ground, the case is different; the centre of gravity being more elevated, the load is more quickly thrown out of balance with a high cart than a low. Moreover, it is an advantage to the horse on hilly ground to bear some portion of the weight on his back, since it increases his weight, and consequently his power of traction; therefore, for farm purposes a low cart, and for level road-work a high cart is best. All that has been advanced in favour of a low cart applies with still more force to harvest carts. The difficulty of keeping the load steady, in consequence of an elevated centre of gravity, has in many instances in hilly districts induced the use of waggon for harvesting purposes. Where the carts are kept low and wide, carts may be with safety used for harvesting purposes. It is true that in a cart the load is exposed to more jerks than in a waggon, since a portion of the load in the former is borne on the horse's back, and must necessarily partake of the unsteadiness of his

motion. Where the harvesting frame consists of two or three parallel or horizontal bars, small loads can only be taken at a time. It increases the power of cohesion of the load to have only one bar at the front and back, since the sheaves are bent over the single bar by the weight of the load, and thus obtain a firmer hold. The best mode of keeping the load steady and secure is by the use of curved raves, as in Crosskill's, Busby's, and Fry's Newport cart. With these raised ends and sides the motion of the cart tends to condense the load. If the shafts are fixed, as in some of Busby's carts, to the side of the cart, or a crank shaft used, instead of being a continuation of the sole, the greatest power of draught may be combined with the lowest centre of gravity, but this arrangement increases the cost.

III. THE IMPROVEMENTS RECENTLY INTRODUCED.

Under this head we propose briefly referring to some of the most approved varieties of carts. The Scotch tilt-cart is a great favourite with many. The distance between the shafts is 20 to 22 inches. The shaft and frame are of ash, the spokes of oak, the fellys of elm, and the axle of iron. It holds 1 cubic yard of earth, is 5 feet long, 4 wide, and 16 inches deep; with wings it presents a superficial surface of 50 feet, and will carry from 12 to 14 cwt. of straw; its cost is about 12*l*. In the west of England, Milford of Thorveton is well known as a successful competitor for the premiums for carts and waggon of the Bath and West of England Agricultural Society.

At the Yeovil Show, in 1856, Milford obtained the prize for a cart with solid sides, having iron work in the thickness of the wood, and furnished with spring catches for the tailboard. The Judges remark on this:—

"It was thoroughly well turned out of hand, but susceptible of further improvements in construction, and especially in the form of the projecting ends of the bottom frame, which strike the ground when the cart is tipped, and which, being *straight*, are subject to a cross strain more likely to break them than if curved (as in a cart exhibited by Lane), so that the *end* grain of the wood should strike the ground instead of the *side*."

Although his materials and workmanship are good, perhaps there is scarcely enough attention paid by Milford to principles of construction. There are too many opportunities given for the lodgment of wet. Busby, by greater attention to these points, has succeeded on several occasions in carrying off the prize from Milford. Busby's wheels have less dish than Milford's; this lessens draught. The axle he employs is iron; this enables him to keep the body lower, although his wheels are slightly higher than Milford's. The mode of tipping is in itself good, and affords a ready means of adjusting the load, so as to preserve a level on

hilly roads. This gives great relief to the horse. There are likewise fewer places for the lodgment of wet, and fewer nails and mortices than in most carts. The arrangement and strength of the lades in Busby's cart is worthy of notice; perhaps however there is scarcely sufficient support given to the sides at the hinder part. The special advantages of Busby's cart, as it now stands, are:—

1st. The lowness of the load, less labour in filling, less risk of upsetting.

2nd. The height and construction of the wheels; easier draught for the horse; in fact, the maximum of purchase for the wheel is now combined with the minimum of lift in loading, unless with a cranked axle, which is objectionable on the score of expense.

3rd. The absence of all panelling and needless holes for the wet to lodge in.

There is not one mortice in the whole cart, all being fastened by tying the pieces together in the most simple manner, with bolts and screws. Every plank, therefore, can be replaced by a new one. Crosskill manufactures a good cart for general purposes, which he calls the Model one-horse cart. It has twice received prizes from the Royal Agricultural Society of England. It is a strong, plain, simple cart, and a great improvement on the old-fashioned ponderous two-horse carts, or still more clumsy four-horse waggon. Its cost varies with its size as follows:—

Load.				Cost.		
				£.	s.	d.
25 cwt.	.....	2½ × ½	.....	12	0	0
25 cwt.	.....	4 × ½	.....	12	10	0
30 cwt.	.....	2½ × ¾	.....	13	0	0
30 cwt.	.....	4½ × ½	.....	14	5	0

To these carts, flat or curved raves shelvings may be attached for harvest work. The disadvantage of these carts for harvesting purposes is the increased height of, and smaller surface presented for, the load. The cost of these extras is as follows:—

			£.	s.	d.
Harvest shelvings for 25 and 30 cwt. carts	..	..	1	10	0
Curved harvest raves for 25 and 30 cwt. carts	..	..	2	0	0
Patent axles and oil-boxes	..	..	1	5	0

The tilt of this cart is simple and effective. The cart rests on the shafts instead of being placed between them. Mr. Crosskill, however, manufactures another cart where the body is placed between the shafts, and thus brought very low upon the axle. This plan reduces the width of the cart, and, as Mr. Crosskill remarks, renders it applicable only to the south of England, where the width of the ruts enables the wheels to be set further

apart than in the northern counties. Being made without soles, this cart does not equal the first in durability for general purposes. It is constructed to carry 25 cwt., and costs from 12*l.* to 12*l.* 10*s.*, according to the width of the tire. If fitted with curved raves, the cost is 2*l.* more.

Whilst mentioning Crosskill's name, we should allude to his patent wheels. The manufacture of these wheels is conducted almost entirely by machinery, which enables them to be constructed more cheaply and strongly. The naves are of iron, cast upon steel pins, by which process they become so hard as to resist the file. When the spokes (made of well-seasoned oak) are properly driven, the wheel is fixed in a lathe, and the end of each spoke is turned, with the greatest possible accuracy, to fit double-shouldered sockets, bored with equal precision in the felloes. The felloes, too, are turned in a lathe; after which the hoop-tire is cut, bent, bevelled, and put on by machinery, with an accuracy and firmness that cannot be equalled by any hand process. The wheels can be supplied either with or without axles, and either with iron naves or wood naves and bushes. The axles of all the iron nave wheels are made to a gauge, so that wheels of different widths will fit the same axles; or, in case of accident, new wheels can be sent from Beverley without the axle being returned.

Price per Set of Wheels and Axles with Wood or Iron Naves.						Price per Pair of Wheels only with Wood Naves.	
No.	Height of Wheels.		Width of Tire.	Size of Axle.	To carry a Load.	Price per Set.	
	Ft.	In.	In. by In.	In.	cwt.	£.	s. d.
1	4	6	2½ by 4	2½	25	6	10 0
1	4	6	4 " 4	2½	25	7	0 0
1	4	6	4½ " 4	2½	25	7	10 0
1	4	6	2½ " 4	2½	30	7	0 0
1½	4	6	3 " 4	2½	30	7	10 0
1½	4	6	4 " 4	2½	30	8	0 0
2	4	6	4½ " 4	2½	30	8	5 0
2½	4	9	2½ " 4	2½	30	7	10 0
2½	4	9	4½ " 4	2½	30	9	10 0

Note.—If patent axles and oil-boxes are added, the cost is increased 1*l.* 5*s.*

Crosskill also manufactures a good pair-horse waggon, which has for four years carried off the prize of the Royal Agricultural Society.

The application of the drag in this waggon is ingenious. It is constructed to carry 3 tons, has 2½ inch tire-wheels, and costs, with pole and shafts, 29*l.* 10*s.* The patent axles and oil-boxes involve a further outlay of 2*l.* 10*s.*

Messrs. Fry, of Bristol, make a cart, for which they claim the attention of agriculturists, known as the Newport cart. One

good feature in its construction is that the body is kept low. Its price, with $3\frac{1}{2}$ -inch wheels, is 15*l*.

Stratton's (of Bristol) cart-wheels are deserving of notice. The spokes are of bar-iron, each spoke being a double loop of iron, and the whole surrounded by an iron rim. The cost of these wheels is from 7*l*. to 8*l*. a pair.

We may mention that Mr. Crosskill has invented a self-acting backboard, as also has Mr. Dunn, of Wellington: these, however, apart from their ingenuity, are of comparatively little value. The same remark applies to Thatcher's self-acting drag, which costs 3*l*. 10*s*.

Nearly all the carts we have mentioned can be fitted with wings, so as to serve as harvest carts; but as Mr. Stephens, in his 'Book of the Farm,' observes, "the common corn or hay-cart is a more convenient and efficient vehicle for carrying the grain-crops into the stack-yard than the tilt-cart with the frame, inasmuch as the load is more on the level with the horse-draught, and the body being dormant, the load is not liable to shake with the motion of the horse."

Robertson's and Hannam's harvest-carts are the best known. The same wheels that serve for ordinary bodies or liquid-manure tanks will serve for Robertson's body. The framework costs from 5*l*. to 7*l*. It weighs, with wheels, 7 or 8 cwt. It presents a flat surface 7 feet by 11 feet. The bed is 2 feet 6 inches from the ground. A board, 4 feet 6 inches, extending over the top of the wheels, enables the man to pitch the load more easily.

Hannam's harvest cart is long and wide, the body being about 12 feet long by 6 feet 6 inches wide; the body is kept as near the ground as possible by the use of bent shafts. It weighs $6\frac{1}{2}$ cwt., and is sold by Messrs. Fry, of Temple-street, Bristol, for 15*l*. 15*s*.

The Number of Carts or Waggon, either or both, required in West Country Farms of various sizes, from 200 to 300 acres.

The requirements and the views of different farmers differ so widely that it would be difficult to lay down any general average. Nothing can be more fallacious in farming operations than to fix a certain standard, with the view of applying it indifferently to all neighbourhoods. The nature of the soil, the system of cultivation, and the climate, all vary so much that nothing like an accurate estimate can possibly be formed. We will, however, give the opinion of three or four practical men on this subject. One gentleman, who farms in Cornwall, thus writes us:—

"Much depends on circumstances, of what description the farm is, as to the number of carts and waggon that would be used. I believe it would be

necessary to have not less than four carts and three waggons for the working of a farm of 200 acres. Although farmers who live in farms of this size may do with less, of the latter especially, by borrowing one of another, which is often done by small farmers, nevertheless, the working of a farm cannot be well done at all seasons without this number; and a farm of 300 acres would require only about one cart, and, if nearly all arable, one waggon more than a farm of 200. My father first rented a farm of 280 acres, and always kept from 4 to 5 carts and 2 waggons, and 2 curreys, the latter made up cheaply on purpose to carry hay and corn.

"My present farm is nearly 500 acres. I use 3 small carts for one horse, or two occasionally, and 4 large carts for two and three horses, and never less than 4 waggons, and generally 5. I keep one light one to go on roads when only a small one is needed; but the latter is not particularly needed. Sometimes farmers have in use carts that they can attach ladders to, to carry corn, which would save a waggon or two; and this practice is done generally on hill farms, and where waggons cannot be well used."

Another farmer, resident near Bridgewater, says:—

"My farm is about 500 acres, and I use on it 7 waggons and 7 carts. I think a farm from 200 to 300 acres would require 4 waggons and 4 carts."

Another farmer, resident at Wrington, says:—

"In reply to your inquiry, I beg to say I think 3 dung-carts, so constructed that they might be occasionally used for other purposes during the harvest, &c., and (when liquid manure becomes more generally used) 2 liquid-manure carts, will be required.

"In some districts I believe waggons are most useful for hauling hay and corn; 3 are required during the harvest. I am aware that one-horse carts are considered by some men preferable to waggons, but my experience teaches me that waggons are best if the hay or corn has to be conveyed some distance on hilly or irregular roads."

A Devonshire farmer says:—

"On our farms, from 200 to 300 acres, generally about one-half arable, there would be wanted 4 carts and 3 waggons or kerrya, and even sometimes in harvest another waggon may be borrowed of a neighbour, if corn or hay has to be carried any distance."

The foregoing forms, we believe, a fair sample of the different opinions held in different districts.

There is still in the West of England a leaning in favour of the old waggon, especially for harvesting purposes. We believe an improved mode of construction must eventually drive the waggon out of the field. We have already shown how the cart may be adapted for harvesting as well as other farm purposes. It is mainly through defective construction in carts that waggons have been able so long to maintain their ground.

Of the liquid-manure cart we say but little, as we believe it will be found most advantageous to apply the manure in a solid form, and that therefore there will be eventually little or no demand for the liquid-manure cart.

Probably the smallest number of carts it would be possible for

any farmer to manage with would be three $4\frac{1}{2}$ inch-wheel carts and one 3 inch-wheel cart; the $4\frac{1}{2}$ inch being for farm, and the 3 inch for market, purposes. This is very much less than any farmer ought to have.

With three dung-carts, one may be filling, one going, and the other returning. We prefer the $4\frac{1}{2}$ inch-wheel to a wider one, for the 6 inch we think too heavy for harvesting purposes; the 3 inch wheel would cut the land, which the $4\frac{1}{2}$ inch does not.

The cart, we have already said, is, in our opinion, vastly superior, for nearly every purpose of the farm, to the waggon; still the waggon has many advocates. A heavy load of hay may be hauled to the pasture-ground, and allowed to remain on the waggon until the sheep have consumed it. This is an advantage. Again, where the farm lies scattered and hilly, a waggon may be more useful than a cart, on account of the advantage of dragging in going down hill.

We have now discussed the various heads of our subject, and have, we trust, proved that the cart, for all farm purposes, is superior to the waggon, and that it only requires a correct knowledge on the part of our mechanists to supersede the latter. If this paper should induce a more careful consideration of these principles, its object will have been well answered.

VI.—On Orchards. By WILLIAM HEALE, Upton Nurseries, Chester.

THE cultivation and management of orchards, generally speaking, is much neglected in the western counties. The treatment they require is not well understood, and in most cases they are left to themselves as soon as they have become well established in the soil. The care they receive is confined to cutting off dead branches, or those which hang down in the way of cattle that are allowed to graze under them.

In the accompanying pages it will be my aim to give such information to the cultivator as has either fallen within my own observation and practice, or as I have been enabled to gather from the published opinions of others.

To the late Mr. Andrew Knight we are much indebted for the improvement of the race of fruits in this country: many of his seedlings have proved themselves to be of great value.

The Horticultural Society of London, during the time he was connected with it, conferred great benefit on this country. Great pains were taken to test the quality of the fruits cultivated, and to class them under their correct names, many kinds of apples,

pears, &c., having previously had a large number of synonyms differing in different localities. Their catalogue of fruits, published in 1842, is a work no pomologist can do without, and their supplement, published since, although not so complete, is of great utility, and reflects much credit on Mr. Robert Thompson, who has spent the greater part of his life in the service of the Society and in the study of fruits. Some idea may be formed of the magnitude of this work, from the fact that in the catalogue of 1842, 897 distinct sorts of apples, 442 distinct sorts of pears, 127 distinct sorts of plums, and 80 distinct sorts of cherries, besides hundreds of peaches, nectarines, apricots, &c. (which are not used in this country as orchard fruits), have all been tested in the Society's garden, and all have their synonyms attached.

During the last few years no advance of any consequence was made by the Horticultural Society as regards orchard fruits until last autumn, when the Society had a magnificent display of both home and foreign fruits at Willis's Rooms (London), and awarded prizes to a considerable amount.

This inertness on the part of the Horticultural Society called into existence a society bearing the title of 'The British Pomological Society,' which holds numerous meetings during the year, and has received the support of all the leading nurserymen and gardeners, both professional and amateur, in the United Kingdom. This Society affords to all persons, whether members or not, the means of having their fruits (especially seedlings) tested against all the best known existing sorts.

Mr. Rivers, of Sawbridgeworth, publishes also annually a descriptive catalogue of fruits of great utility to every cultivator, and it has this merit, that the accuracy of its descriptions can be relied upon, having been made from his own personal observations.

There is one of his recommendations, however, on which I must differ from him, *i. e.* the cultivation of the pear on quince stocks; this may probably be of utility on very stiff clay-land and for garden trees, but on light lands and for orchard purposes I would caution purchasers against it. I have known so many failures arise from this stock having been used, that I recommend no pear-trees but those grown on pear stocks.

Mr. Rivers has also published several other valuable and interesting works on fruit trees. There is one class of fruits that seems, however, not to have attracted the attention it deserves—*viz.*, apples used for cider. Whilst fruit for dessert and kitchen purposes has been largely grown, and great improvements have been made in it, the cultivation of trustworthy kinds for cider seems to have been neglected, and there are no data by which correct nomenclature can be ensured.

The demand for fruit trees of all descriptions, during the last

years, has been unprecedented, and nurserymen have had difficulty in keeping pace with the demand: standard trees at the present time are very scarce.

Large quantities of stocks, both of working fruit trees and of trees for planting, are also exported yearly to the United States, Canada, and other parts of the globe. This shows that our trees are now highly appreciated, and there is not much doubt that the growth of orchard fruits is remunerating. I will here insert an extract from Turner's 'Florist and Fruitist for 1856,' in which there is a quotation from Downing's 'Fruits and Fruit Culture of America.' Mr. Downing, treating on orchard culture,

—
 "In a bearing year of the apple, in common culture, only takes place every second year, owing to the excessive crop which it usually produces, by which it exhausts most of the organisable matter laid up by the tree, which then requires another season to recover, and collect a sufficient supply again to form buds."

"When half the fruit is thinned out in a young state, leaving only a moderate crop of the apple, like other fruit trees, will bear every year, as it will also if the trees are kept in a high condition." He adds in a note—"One of the finest orchards in America is that of Pelham farm, at Esopus, on the Hudson. It is remarkable for the beauty and high flavour of its fruit than the conductivity of the trees."

"The proprietor, C. J. Pell, Esq., has kindly furnished us with some notes of his experiments on fruit trees, and we subjoin the following one on the

—
 "For several years past I have been experimenting on the apple, having an orchard of 2000 bearing Newtown pippin trees, I found it very unprofitable to have what is termed the "bearing year," and it has been my aim to assist the trees so as to enable them to bear every year. I have noticed that from the excessive productiveness of this tree it requires the intermediate year to rest itself, to extract from the earth and atmosphere the materials to enable it to produce again. This it is not able to do, unassisted by art, while it is laden with fruit, and the intervening year is lost. If, however, the tree is supplied with proper food it will bear every year; at least such has been the result of my experiments."

"Three years ago, in April, I scraped all the rough bark from the stems of about a thousand trees in my orchard, and washed all the trunks and stems with soft soap, trimmed out all the branches that crossed each other, and painted the wounded part with white lead, to exclude moisture and prevent decay. I then in the latter part of the same month slit the bark by running a sharp-pointed knife from the ground to the first set of lenticles, which prevents the tree from becoming bark-bound, and gives the wood an opportunity of expanding."

"In July I placed one peck of oyster-shell lime under each tree, and left it around the trunk until November, during which time the drought was excessive. In November the lime was dug in thoroughly. The following year I reaped from these trees 1700 barrels of fruit, part of which was sold in New York for four and others in London for nine dollars per barrel. The cider made of the refuse, delivered at the mill, two days after its production, I sold for 3½ dollars per barrel of 32 gallons, exclusive of the

—
 "In October I manured these trees with stable manure, in which the

ammonia had been fixed, and covered this immediately with earth. The succeeding autumn they were literally bending to the ground with the finest fruit I ever saw, while the other trees in my orchard, not so treated, were quite barren, the last season having been their bearing season. I am now placing round each tree one peck of charcoal dust, and purpose in the spring to cover it from the compost heap.'

"If time and space allowed I could make many more extracts from this work to show that, in America, orchards, when neglected, bear crops every alternate year only, but when under proper culture they bear every year.

"When our orchardists imitate the labour and perseverance of this American gentleman, who takes so much pains with his Newtown pippin trees, then may we hope to hear no more outcries as to the failure of our crops."*

The foregoing is worth careful perusal. It is to be remembered, however, that orchards in America are not so liable to late spring frosts as they are in this country. I saw some time since a valuable suggestion for counteracting these spring frosts—viz. with the prunings of the trees, dead wood, turf, leaves, or any vegetable matter, to make fires in different parts of the orchard during the time the trees are in bloom, and thereby to increase the temperature of the surrounding atmosphere during the night, and thus prevent the frost from destroying the flowers. I forget in what publication this met my notice; I believe it was in the 'Gardener's Chronicle,' but I am unable to find it.

There is no doubt that a great deal may be done, and with very little trouble, to cause the trees in orchards to bear more regularly than is usually the case. Insects often destroy the crop after the fruit is set and has begun to swell: these might be kept under by scraping off the loose bark, and painting the stems and branches with a composition in the spring. This, however, I will enter into more fully under the head of "Insects, Diseases," &c.

A great deal has been lately written about the wearing out of races of plants: the editor of the 'Scottish Gardener,' more particularly, has endeavoured to convince his readers that all fruits and vegetables are fast wearing out, and that unless something is done to resuscitate them we shall soon lose them. He was promptly met, however, with an array of facts that disproved his fallacious theory, and little has been heard respecting it for some months past.

Amongst other trees and plants he mentioned the golden pippin and Ribstone pippin apples; these grow as vigorously as ever, and are as little liable to disease as any other trees. I was to-day (February 10, 1858) looking through a piece of ground containing some thousands of apple-trees of two and three years' growth, and I found Ribstone pippins more vigorous than many, also golden pippins; and I cannot do better than quote a note

* Mr. Saul was the contributor of this article.

by Mr. Rivers in the 'Gardener's Chronicle' of October 17, 1857, page 708. The editor says,—

"We have lately received from Mr. Rivers specimens of the true old golden pippin, gathered from a tree planted by his grandfather. They have the same delicious smack that gave the sort so great a reputation.

"We understand that the young trees grafted from the old stock are more healthy than they have been for many a long year, nor indeed have they been for some years so subject to canker as they used to be thirty or forty years ago.

"We cannot but wonder that those who place fruit trees on a level with the supplemental noses of the great Taliacotius, should not have remarked that the so-called wearing out of races is unknown in the warm climates of Continental Europe."

There is also in the same periodical a notice of a very large apple-tree; *vide* 'Gardener's Chronicle' of July 19, 1856, page 86;—

"There is at the present time a very remarkable tree growing in an orchard in the occupation of Mr. Pitts, of Powderham. This tree has been known to produce seven hogsheads of cider in a single season. People now in the neighbourhood have assisted in gathering 36 bushels of apples from under it in a morning.

"Many of the inhabitants remember this tree about the beginning of the present century as a very fine one, with branches extending, they think, full 60 feet on each side, and with an altitude in proportion.

"There are, however, no reliable data as to its dimensions fifty years ago, and time has considerably shorn it of its fair proportions; still its present appearance would argue that, if it bore fruit in proportion to its size, its productive powers appear not to have been overrated. The trunk, 6 feet from the ground, gives a circumference of 6 feet 4 inches. Another tree apparently of the same kind in the same orchard girths 6 feet 2 inches. Several others have arrived at nearly the same size. The kind of apple was very similar to the Herefordshire red streak."

The editor of the 'Gardener's Chronicle' also brought together a host of facts completely overwhelming the erroneous doctrine, so that no one who wishes to plant any of the good old sorts of apples need fear doing so.

I will now endeavour to give my views of the choice of site and preparation of ground.

The site, if possible, should slope gradually towards the south, and should be sheltered from the north and east winds, more especially the latter. There should be no tall trees within fifty or sixty yards of it, as want of light and air is frequently the sole cause of the sterility of an orchard.

The most suitable soil is a rich yellow loam, with a subsoil of marl or clay. The finest and best flavoured fruit will generally be grown on such a soil. Frequently, however, in the same parish, the soil will not be similar in any two orchards, but by preparing the land well, previously to planting, fruit trees will grow in almost any soil, unless it be a retentive clay. If the

subsoil be wet the land should be drained 3 or 4 feet deep and 12 feet apart; it should also be trenched 2 feet deep. The future success of the orchard will mainly depend on this work being well done. It should be done (if possible) twelve months before the orchard is planted, so that the soil brought to the surface from the bottom of the trench may have the full benefit of the sun and air before the trees are planted. The ground should be well manured with stable dung, and planted with mangolds, swedes, or some other crop that will keep it clear of weeds during the summer. The trees should be planted early in the following November to give them time to become settled in the ground before winter.

If the soil is of a light sandy description, it would be much benefited by having a coating of rotten turf dug in before planting the trees, and if this could be obtained from a stiff loamy soil it would be the more beneficial. If, on the other hand, the soil is stiff clay, a dressing of rotten turf from light soil, or of turf or wood ashes, dug in before planting, would tend to increase the vigour of the trees.

Many farms consist entirely of grass land, the surface-soil and subsoil of which is a very stiff retentive clay, producing first-class cheese and butter, and yet, on looking at the orchards on such farms, the trees appear mossy and half dead. A good orchard is a desideratum on such a farm, and it might be obtained by forming mounds of two or three cartloads of rotten turf or parings of the water-furrows, well decomposed, on which to plant the trees. There are often seen on dairy farms large heaps of this description, and they could not be used for a better purpose.

The foregoing remarks are intended to show the manner of preparation for planting an entirely new orchard. No grass should be sown under the trees for six or seven years. To make an orchard as profitable as possible, I think the soil during that period should be well cultivated and cropped annually with vegetables. Grass during the hot summer months takes every drop of rain that falls for its own especial benefit, and leaves the fruit trees to get nutriment in an indirect manner, and injures both the quantity and quality of the fruit.

In filling up vacancies in orchards already well established, it would greatly assist the tree to be planted if the soil were taken out 2 feet deep and 4 or 5 feet in diameter, and the hole filled up with well-rotted turfy loam and manure: the progress of the tree would amply repay the trouble taken.

SORTS OF TREES SUITABLE FOR PARTICULAR SOILS AND SITUATIONS.

Soils vary so much that it is impossible to enumerate each particular kind in this essay: it will, however, answer our purpose

to divide the surface-soils into three divisions—viz., firstly, light soils, comprising peat, sand, and sandy or hazel loam; secondly, mediums, comprising yellow and red loam, also clay, with a portion of loam or other matter that usually keeps it in a dry or workable condition, unless in wet weather; thirdly, stiff retentive clay and marl.

These could be easily managed, and would be but a slight impediment to the practical man. The subsoil, however, has the most influence both on the growth and productive properties of the tree; for as most trees throw some of their roots downwards as straight as possible, so that they may have sufficient hold of the soil to be protected against violent winds, and as upon these roots the vigour of the tree usually depends, if they should be injured, either by accident or by any matter in the soil injurious to vegetation, the trees will soon show it, either by canker or mossy stems and branches. It is by cutting off these roots that very vigorous unfruitful trees are brought into a bearing state.*

The roots that grow horizontally and creep just beneath the surface of the soil, throwing out numberless small fibres in every direction, are principally the means by which the leaves and fruit respectively draw nutriment from the earth. This is clearly shown in the case of a tree suffering from excessive drought. If, as soon as possible after the sun has ceased to influence the soil, the surface around the tree is well watered, in the morning the tree will have regained its accustomed appearance of vigour, and will most probably continue in that state for several days, unless the sun or drying winds evaporate the moisture imbibed by the tree. I have perhaps digressed too much from the subject; I only, however, inserted these remarks to show the influence which the surface and the subsoil both have on the tree.

I will now divide the subsoil in the same manner I have before done the surface-soil, viz.—1st. Sand in its several forms. 2nd. Clays of different kinds. 3rd. Rocky and brashy.

The fruits most suitable for these several kinds of soils will be—
1. Where the surface-soil is sand and the subsoil sand, apples, pears, plums and cherries, walnuts and filberts, unless the subsoil should be a wet sand of considerable depth, or should contain a large quantity of iron, in which case only cherries, plums, and a few pears, such as green chisel or swan's egg, will thrive, and these (*i. e.* the pears) will most probably canker; the cherries and plums will grow and bear profusely. 2. Should the surface-soil be loam, with a clay subsoil, all kinds of orchard fruits will suc-

* The better plan is that of placing a flat stone under the tree when it is being planted: this gives the rootlets a horizontal growth, above the unhealthy subsoil.—R. S.

ceed to perfection, provided the clay subsoil be properly drained. 3. If the soil on the surface is sand or loam, with a limestone rock or brashy subsoil, some kinds of apples will succeed, also most pears and plums. Cherries will not pay as orchard fruit in such a soil, and should be confined to the garden, as they will be stunted in their growth and usually overrun with moss.

Generally speaking, apples will be found to succeed best on a strong loam surface-soil, with moderately retentive clay as subsoil.

Pears will do as well as apples in such a soil, and will grow and bear profusely (although taking a greater number of years to come into bearing than apples) in all kinds of clay and marl, provided the subsoil is properly drained.

Plums and cherries will do best in light lands and stiff loams; a clay soil is too cold for them, and they become stunted and mossy in it and do not set their fruit properly; and when the fruit does set, the greater portion of it usually falls off during the process of stoning.

Filberts will do well either in sandy soils or loam, but clay is unfit for them. Walnuts will thrive in almost any soil; the fruit from trees growing on light lands is, however, the best flavoured.

I will now give a list of the fruits best adapted for the various soils.

The first list will be the varieties that will be found to succeed best in sand, peat, and hazel-loam surface-soils, with sand or rocky subsoil, and I give them in their order of ripening:—

Apples for Dessert.

	Period of the year when fit for use.
Early red Margaret or red Juncating	July.
Oslin	August.
Devonshire quarendon	August.
Kerry pippin	September.
Early nonpareil, or Hicks' fancy	October to December.
*King of the pippins, or golden orange pear- main	October to December..
Cox's orange pippin, superior to that old favourite Ribstone pippin	November to January.
*Wheeler's russet	November to April.
Court pender plat	November to April.
Claygate pearmain	November to May.
Ashmead's kernel	November to May.
*Dutch mignonne	December to April.
Cockle pippin	January to April.
Court of Wick	February.
Scarlet nonpareil	January to March.
Pearmain Lamb Abbey	April.
*Reinette du Canada	April to June.
*Sturmer pippin	April to June.

Those kinds marked thus * are also excellent kitchen apples.

Kitchen Apples, in their order of Ripening.

	Period of the year when fit for use.
Hawthornden	August to November.
Manks codlin	October and November.
Tower of Glammis	November to February.
*Rhode Island greening	November to March.
Northern greening or John apple	November to April.
Gravenstein	November.
Waltham Abbey seedling	December.
Dumelow's seedling, or Wellington or Normanton Wonder; makes the best jelly and sauce	December to March.
Hanwell souring	December to March.
*Baxter's pearmain	December to March.
Beauty of Kent	January.
London pippin	March.
*Fearn's pippin	March and April.
Rymer or Caldwell	April.
Gooseberry	May.
Easter pippin	2 years, keeps quite sound.

Those kinds marked with an * are also useful dessert apples.

Cider Apples.—These would not, perhaps, produce such good cider as from orchards on heavier soils. For a selection of best kinds I must refer to list 2.

Pears, Dessert.

	Period of the year when fit for use.
Doyenne d'Été	July.
Green Chisel	August.
Autumn Bergamot	September.
Williams' Bon Chrétien	September.
Beurre d'Amanlis	End of September.
Comte de Larny	October.
Dunmore	October.
Louise Bonne of Jersey	October.
Seckle	October.
Aston Town	November.
Thompson's	November.
Beurre Bosc	November.
Eyewood	November.
Emerald	December.
Glout Morceau	December.
Hacon's Incomparable	December.
Broom Park	January.
Easter Beurre	January to May.
Winter Beurre	February to March.
Beurre Raneé	March to May.

Stewing Pears.

Bellissime d'Hiver.	Catillac.
Bon Chrétien Turc.	Uvedale's St. Germain (very large).

Plums.

	Period of year when ripe.
Early prolific (Rivers)	End of July.
Gisborne's	Middle of August.
Nectarine, also Jenkins' Imperial and Cal-	
donian, of some	Middle of August.
Victoria (Denyer's)	Beginning of September.
Pond's seedling	Beginning of September.
Prince of Wales (Chapman)	Beginning of September.
Jefferson	Beginning of September.
Diamond	Middle of September.
Huling's superb	Middle of September.
Kirke's	Middle of September.
Washington	Middle of September.
*Frost's Gage	October.

* Mr. Rivers calls this American damson; it is very prolific and hardy.

The above is a very choice selection for orchard purposes, all being hardy and prolific; add, also, prime and common damsons.

Cherries.

	Period of the year when fit for use.
Werder's early Blackheart	Beginning of June.
Belle d'Orléans	Middle of June.
Archurde	Middle of June.
Mayduke	End of June.
Black Tartarian	Beginning of July.
Elton	Middle of July.
Royal Duke	Middle of July.
Bigarreau	End of July.

Buttner's Yellow.—This is worthy of a trial: it is said to be very good, and from its peculiar colour escapes the notice and attack of birds better than most others.

Filberts.

White or Common.	Frizzled.
Red.	Cosford (nut), very thin shelled.

My second list will be for surface soil No. 2 (being medium), comprising yellow and red loam, also clay with a portion of loam or other matter that usually keeps it in a dry or workable condition, unless in wet weather—the subsoil being of that classed as No. 2, clays of different kinds, or as is sometimes termed marly.

Apples, Dessert.—All the kinds in list 1, with the following added:—

	Period of the year when fit for use.
Duchess of Oldenburgh	September and October.
Wormsley pippin	September and October.
Blenheim pippin (or Blenheim Orange)	November and December.
Wyken pippin	November and December.
Old Pomeroy	October to February.
Ribstone pippin	December to March.
Deux Ans Hambledon	March to June.
Spring Ribstone pippin	May and June.

Kitchen Apples.—All the kinds in list 1, with the addition of—

Mère de Ménage (Combermere of Cheshire)	October to January.
Yorkshire Greening	October to January.
New Hawthornden	December and January.
Lemon pippin	October to April.
Lucombe's seedling	October to March.
Alfriston	November to April.
Royal Russet, or (Leathercoat)	November to May.
Bedfordshire foundling	March.
Bess Pool	May.

For the following list of cider apples I am indebted to Mr. Samuel Williams, of Widemarsh Gate, Hereford, a large cultivator for sale of these trees, and it can be relied upon as containing all the best known kinds from which prime Herefordshire cider is made.

French Varieties (i. e. Varieties of French Origin).

Handsome Norman.	Glasbury Norman.
Yellow Norman.	Siberian bitter-sweet (Knight's).
Red Norman.	Bell Norman.
White Norman.	

The above are the best bearers, but in a note attached Mr. Williams says: "The old kinds named below, although shy bearers, make the best cider." These are:—

Foxwhelp.	Winter Queening.
Cowarne, red.	German.
Wilding.	Sam's Crab or Longvilly Kernel.
Skirm's Kernel.	Dilwyn Fox Apple (new).
South Queening.	Broad Tail.

I also append a list of a few other kinds of cider apples that are used in different localities.

Cadbury (a bitter-sweet; cider from this alone will not keep).	Herefordshire redstreak.
Coccagree (an old and esteemed kind).	Cowan Queening.
Golden Harvey or Brandy.	Romril.
Devonshire redstreak.	Siberian sugar.
	Sops of wine.
	Northern Greening.

It is very difficult to obtain any reliable information on cider apples and perry pears, and I trust that the Horticultural Society of London, and the Pomological Society, will each, at their autumn meeting, give a prize for the best collection of cider apples and perry pears, as some inducement to growers to make the kinds generally used in the various cider and perry making localities more extensively known.

Pears.—In addition to the list named in No. 1, the following are first-class kinds, and will suit the soil well:—

	Period of the year when fit for use.
Beurre Giffort	.. Middle of August.
Gratioli of Jersey	.. October.
Forelle or Front	.. December.
Passe Colmar	.. December and January.
Marie Louise	.. October and November.
Crossane d'Hiver (Bruneau)	.. March.

Perry Pears.

Barland.	Hennenbirne.
Huff-cap, brown.	Teinton Squash.
Huff-cap, green.	

Plums.—List No. 1 is so good, I can only add two old favourites to it, viz. :—

	Period of the year when fit for use.
Greengage	End of August and beginning of September.
Golden Drop	End of September.

I cannot call these two kinds profitable, as they are both very liable to have their blossoms killed by spring frosts; still, from their superior excellence, a tree or two of each might be planted. I know nothing more delicious than a golden drop plum, hung in a dry airy room until the skin is shrivelled. It requires to be tasted to be appreciated.

Cherries as in List No. 1.

Filberts, ditto

The third list will be for the cold soils, as in division 3; surface soil, stiff clay and marl, with stiff retentive subsoil: the kinds for this soil must be very hardy and prolific. I have still kept an eye to quality.

Apples, Dessert.

	Period of the year when fit for use.
Early red Margaret or red Juncating	.. July.
Oslin	.. August.
Devonshire Quarendon	.. August.
Ingestrie Yellow	.. October.
King of the pippins	.. October to December.
Court of Wick	.. February.
Cockle pippin	.. January to April.
Rhode Island Greening	.. November to March.
Wheeler's Russet	.. November to April.
Dutch Mignonne	.. December to April.
Reinette du Canada	.. April to June.
Sturmer pippin	.. April to June.

Kitchen Apples.

	Period of the year when fit for use.
Manks Codlin	.. October.
Gravenstein	.. November.
Alfriston	.. November and December to April.
Wellington	.. December to March.

Hanwell Souring	December to March.
London pippin	March.
Fearn's pippin	March and April.
Rymer	April.
Royal Russet	March to May.
Bess Pool	May.
Gooseberry	May.
Easter pippin	2 years.

The above apples can be used for kitchen purposes from November. The time noted above is meant to convey some idea of when they will be in their prime.

Cider Apples.—A selection from list 2. I cannot give preference, not being sufficiently acquainted with them.

Pears, Dessert.

	Period of the year when fit for use.
Green Chisel	August.
Windsor	August and September.
Autumn Bergamot	September.
Hessel	September.
Aston Town	October and November.
Seckle	October.
Louise Bonne of Jersey	October.
Thompson's	November.
Eyewood	November.
Swan's-egg	November and December.
Broom Park	January.
Easter Beurre	January to May.

Stewing Pears.

Belmont.
 Bellissime d'Hiver.
 Chaptal.
 Catellae.

Plums.

	Period of the year when fit for use.
Damson, common	
Damson, Shropshire, or Prime	
Gisborne's	Middle of August and beginning of September.
Prince of Wales (Chapman)	Beginning of September.
Diamond	Middle of September.
Nectarine	Middle of August.

In selecting the fruits mentioned in the foregoing lists I have been guided by the following points—viz., quality, appearance, productiveness, moderate size, health, and free growth, and have endeavoured to name all such as under moderately favourable circumstances escape disease, especially canker, the greatest enemy the fruit-grower has to contend with. I strongly advise growers for profit to plant none of the following kinds:—*einette Blanchée*, *Espagne* or *Fall Pippin*, *Nonesuch*, *Ame-*

rican Newtown Pippin, and Christie's Pippin apples; and in cold clay soils avoid Ribstone pippin, Golden pippin, Golden Reinette, Old Nonpareil, Emperor Alexander, Bedfordshire Foundling, and Herefordshire pearmain,—as being kinds particularly subject to canker under adverse circumstances, though, when treated properly, not more so than many other kinds.

MODE OF REARING TREES.

Apples are usually perpetuated by being budded or grafted on crab or apple stocks: the seeds from which these are grown are obtained from the wild crab, or from apples crushed in making cider. The proper time to sow the seeds or pips is the end of April; if sown earlier, they vegetate too quickly, and, rising through the surface of the soil before the late spring frosts are past, are destroyed. The ground should be prepared very finely for them; and if sown in drills one foot apart, they will be ready to transplant into rows the second autumn after being sown; the strongest plants should be selected for this purpose, throwing the weakly ones away. The distance from row to row should be 2 feet 6 inches, and from plant to plant 1 foot. If proper care be taken of them, they will be ready to bud at the end of the following July, or early in the following August (they should be as large as the middle finger at this time). As budding is not generally understood, I will explain the process:—The bud is merely a single eye cut from a tree of the sort you wish to perpetuate; it should be taken from a shoot of the growth of the same summer. The woody portion must be carefully taken out without injuring the piece of bark left, which constitutes the bud to be used. This is inserted in the growing stock, in a manner easily understood when practised; *e.g.* :—Make the cut across the stock to be operated on; then a cut along the line of the block; then raise the bark carefully from the wood on each side of the longitudinal cut and insert the bud; tie with a bandage carefully round, leaving the eye of the bud uncovered. In a fortnight or three weeks untie the bandage, and tie somewhat more loosely, that the stock and bud may both swell; the bandage to be used should be what is usually termed *bass matting*; worsted, or a strip of calico, will do; I, however, prefer *matting*.

The bud will remain dormant until the next spring. Early in March carefully examine the bud, and if it be alive cut the stock off about 1 foot above it; this will check the ascending sap, and the bud will soon start into growth. Be very careful when it is grown a little to tie it to the piece of the stock which has been left above it, not too tightly, or winds may break it off, and a twelvemonth will be lost. Keep all other shoots carefully cut off,

or they will rob the young tree. If you are tolerably successful, the first year's growth of the tree will probably be 3 or 4 feet, or perhaps more, and it will probably be furnished with many side branches (lateral shoots). The next spring, early in March, cut back the side shoots, so that there may be sufficient left to produce a few leaves to strengthen the main stem; also cut off the portion of the parent stock (left above the bud during the past year) just above the union of the bud and stock; this will heal over rapidly whilst the tree is young.

Be careful that the shoot is kept perfectly upright if you wish to secure a handsome tree. The main shoot will, most probably, by the end of the second summer have grown six or seven feet. Early in the next March it should have its top cut off to the height required for the stem, usually six feet. This will cause it to throw out side shoots, and form what is termed the head. Stop all the side shoots except the number at the top required to form the head. If the tree has gone on properly, by the autumn of the third year you will have a fine young tree, such as in many places would be planted in the orchard at once. It would be much better, however, to give another season's growth before removing it; therefore, in the ensuing April, cut all the side shoots close into the stem (not too close), and shorten the shoots comprising the head to three eyes each. This will by the next autumn give you a very fine tree, such as is usually sold for 1s. 6d.

It will now be fit to plant in the situation where it is intended to fruit. The time required to grow a tree of this description is as follows:—

Two years from seed when planted in lines for budding.

One year before fit to bud.

One year from bud and spurred in at the sides to strengthen the main stem.

Two years from bud and headed in (*i.e.* top cut off to form the head).

Three years from bud, cut back each shoot to three eyes, to form a good head prior to permanent planting.

Making six years from the time the seed is sown until the tree is fit for the orchard.

I consider it preferable and cheaper to purchase trees fit to plant at once in the orchard, as six years is a long time to wait, and trees planted and growing would produce a goodly quantity of fruit in these six years. Purchase your trees from some respectable nurseryman on whom you can rely as to having them correct to name.

Apples, pears, plums, and cherries are also sometimes perpetuated by grafting, but standard buds make by far the best trees. As, however, some of the buds will fail, it is usual, when such is

the case, to cut the stocks off early in March, close under where budded, and graft them. The operation is simple enough, but success, both in grafting and budding, can only be obtained by practice. Side-grafting is the kind usually practised; but it is advisable to get some old, skilful hand to show you the way—of course paying him liberally for doing so. From the middle to the end of March is the best time for grafting; if, however, the winds are very drying, accompanied with morning frosts, it would be better to defer the operation until April.

Pears are grown in the same way as apples, only they are budded or grafted on a pear stock grown from seed in the manner described for apples. Plums are budded or grafted upon stocks of the common plum. These are suckers or layers, and can be bought of some nurserymen. Damsons make beautiful trees, worked on these about six feet high. Cherries for standards and dwarfs are budded on the common wild cherry; the seed is sown in the same manner as described for apples; the stocks are much better budded standard high. They always succeed better, worked in this way than when budded low, and run up as apples, pears, and plums are; and standard cherries should always be budded; grafts do not succeed so well.

You cannot have any trees fit to plant in an orchard in less than six years, and, as they will sometimes require seven or eight years, it is the best way to purchase trees from a nurseryman.

Walnuts are usually grown from the nut; grafting is a very uncertain process, and rarely practised with this tree. Filberts are propagated by layers or suckers, or sometimes grafted upon stocks grown from Spanish hazel-nuts. Some writers say they do not throw so many suckers when grafted on this stock: I cannot vouch for this, never having tried it.

I think that all that is necessary to be known as regards propagation has been fully dealt with in this essay, except the raising of new kinds; this is more in the province of the hybridiser. However, should any one wish to produce new varieties from seed, they should take care to save the seed from hardy, free-bearing kinds, with good appearance and high flavour, crossing it with some other kind of superior excellence, having certain desirable properties in which the free-bearing, hardy kind is deficient. The piece of ground in which the stocks are to be planted should have been previously well trenched, and some well-decomposed manure should be dug in when the trees are planted.

PROPER DISTANCE FOR PLANTING.

The proper distance for apple-trees each way is 21 feet. This will require for an acre 98 trees. The proper distance for pears will be the same—viz., 21 feet. The proper distance for plums

and cherries will be 18 feet; the number of trees required for an acre will be 134. Filberts should be planted about 9 feet apart. Walnuts will require 21 feet, if planted the same as apples, &c.

REASONS ALLEGED FOR AND AGAINST THICK PLANTING.

I cannot give any reason in favour of thick planting. The reasons I give against it are—that all trees like plenty of light, and air, and sun to enable them to make and mature their wood and blossom buds. This they cannot do if crowded, as crowding will cause them to overshadow one another, and the consequence will be small, weakly, ill-ripened wood, with few flower-buds, little fruit, and that ill-flavoured. On the contrary, with plenty of light, sun, and air, every portion of the tree will receive equal benefit, and produce well-ripened wood and flower-buds, which are necessary to ensure a well-flavoured and properly-ripened fruit. No benefit can accrue from thick planting. Thick planted trees will grow into each other, and it will be almost impossible to gather what fruit they produce. You will then be induced to cut every other tree down, and when this is done it will be three or four years before the remainder recover from the effects and produce fruit in any quantity. There will be also fewer trees on the ground than there would have been if they had been planted at a good distance from each other originally, and the produce per acre will be proportionately deficient; therefore, I say, give them sufficient room, so that each tree, when twenty years old, shall not touch its neighbour, and you will be well repaid, both in quantity and quality of produce.

TIME AND MODE OF PRUNING.

This is defined under two heads—summer and winter pruning. All possible pruning to produce fruit should be done in summer, or, at latest, as soon as the fruit is gathered, as the pruning at that season produces fruit-buds, whereas severe winter pruning produces little but wood.

Orchard trees will not require a great deal of pruning, if they have been well attended to during the first six or seven years after planting. If branches that cross each other have been taken away, and the head of the tree kept moderately open, to allow the sun and air to penetrate through the foliage, very little requires to be done in the way of pruning, except cutting away dead wood or branches that cross each other, and taking away any weakly shoots from the centre of the head. The great aim at all times should be to keep the head of the tree well open in the middle, so as to allow light and air to penetrate every part of the surrounding branches and foliage.

It is sometimes difficult to prune large trees in summer. Therefore, whatever is required to be done to them should be proceeded with as soon as the crop is gathered and before the leaf falls, unless the head of the tree requires to be cut back, or any portion of the tree requires young wood to supply deficiencies. In that case, the early part of March is the proper time for the operation.

I would, under this head, call attention to the thinning of the fruit, as already mentioned—a very important matter for those who wish to excel in their produce. It could be tried on a small scale at first, and, if found to answer, could easily be carried out on an extensive scale. What would become of half the apricot, and peach, and nectarine trees against walls, if their fruit was not carefully thinned? In a few years they would die from over-cropping. Surely, this practice of the gardener might be imitated by the cultivator of orchards with good results.

In the 'Gardener's Chronicle' of October 17th, 1857, page 712, the editor says, in answer to a correspondent:—

" Winter Apple Pruning.—When a tree of this kind has formed itself, it requires no other pruning in winter than the removal of weak wood, that should be cut clean out, and of shoots that cross and whip each other, of which an inch should be left at the bottom for the purpose of getting fruit spurs. Nothing ruins apple-trees more than excessive use of the knife. Wood that is too weak to form spurs ought always to be removed. Over pruning inevitably leads to the formation of barren wood instead of fruit spurs. Of course old and dead or exhausted spurs should be cut out; and if any shoot should be getting the better of others, it should be reduced to due proportions by the knife."

After quoting such an authority, more under this head is unnecessary.

MANURE AND MODE OF APPLICATION.

Fruit trees in a young state should be supplied very sparingly with manure, unless the ground is very poor, and then it should be well decomposed, as strong fresh manure is injurious, and often causes canker in apples and pears, and gum in plums and cherries. If any is applied at planting time, it should be spread on the surface around the stem, to keep the surface soil cool during the hot weather; what is washed in by the rains will be sufficient food for the young tree.

It is not probable that an orchard will require much manuring during the first ten or fifteen years, unless it is cropped with vegetables; in that case it will require it every year. The manure used should be stable manure well decomposed, not less than twelve months old, or decomposed night-soil four or five years old; a small quantity of this is sufficient, it being very powerful, and much superior to any artificial manure or guano.

After ten or fifteen years the trees will most probably need some assistance, and I should then advise a good top-dressing every autumn of stable manure or night-soil, four or five years old, as before named.

TIME AND MODE OF GATHERING.

The proper time for gathering fruit will of course vary according to the different periods of ripening. The last week in September, or the first and second weeks in October, will usually be the proper time, though this of course will vary according to the season, whether it has been late or early. Early gathered fruit has this year kept better than that which was allowed to mature itself on the tree. The following extract from a paper by Mr. Rivers, in the '*Gardener's Chronicle*' for February 8th, 1858, page 89, will be found interesting:—

"This season has been remarkable for the premature ripening of winter pears; the Winter Nelis, Beurre d'Aremberg, Easter Beurre, and even Beurre Rancee having ripened in November, or early in December. By mere accident, I hope I have discovered a method by which they will not 'ripe and rot' so early in the season as they often do. I had this autumn a very large collection of some hundreds of sorts from my specimen trees, in most cases only two or three dozens of each. As it was of consequence to watch the ripening of the new kinds, I had them placed on the front bench, formed of slates, in a lean-to greenhouse near the dwelling-house; the pears were mostly gathered early in October, and, as the weather was warm and sunny, I had the glass over the bench covered with mats. The back bench was full of camellias, which often requiring water, the air of the house was warm, and at night moist. In very warm days, and there were many in October, the doors and ventilators were opened, to make the house less sultry. The early autumnal pears ripened very gradually and well; I observed many kinds ripened later than usual, but was not much struck with the fact. About the middle of November I had the mats removed from the glass, and directed one of my foremen to remove all the winter pears to the fruit-cellar, leaving all those that ought to ripen in November in the greenhouse, fully exposed to the light through the crown glass with which the lights are glazed. By accident some winter pears were left behind, and I was struck with the fact that Winter Nelis, Beurre d'Aremberg, and Passé Colmar pears (removed to my fruit-cellar, which is dry and airy, with an average temperature of 51°) were fully ripe by the end of November, while those left on the slate bench in the greenhouse were sound and hard. I became much interested in the matter, took notes of the sorts that ripened so slowly, and now find that the bulk of my Marie Louise pears from standards were sent to market fully ripe by the end of September; some specimens left in the greenhouse kept perfectly sound till the middle of December. Beurre Clairgean did not ripen till about the same time; Duchesse d'Angoulême kept till the first week in January; Beurre d'Aremberg and Winter Nelis have just ripened, and are in fine perfection; Passé Colmar are just beginning to soften. All have been of remarkably fine flavour, owing, as I presume, to their ripening slowly and in a warm atmosphere. I must confess that at first I was surprised and unable to account for this, but I recollected that in the warm parts of France the Easter Beurre, which so often ripens here prematurely, is preserved in high perfection till very late in the spring, and is in great estimation; and so I am induced to conclude that a greenhouse temperature, which is dry and warm during the day in sunny weather, is very

favourable to the ripening of pears, and I assume that much watery juice is taken off by evaporation, for I observe that the pears do not shrivel, but their rinds become much harder and apparently thicker than those in the fruit-cellar, and their juice much more saccharine. To this concentration of the saccharine juice I venture to impute the long keeping of my greenhouse pears.

"I hope to be able to pursue this interesting experiment, and fully intend to make my greenhouse, which is a lean-to, 60 feet long, with a brick Arnott stove in it to keep out frost, into a pear-house; and I trust that some of your readers will be induced to do something in the same way, so that we may fully ascertain if pears ripen better with light and warmth than in a cool dark fruit-room. I dare say this method is not new, for what have we 'new under the sun'? but I do not remember having read about keeping pears in a greenhouse, although I think there is some record in the Horticultural Society's transactions of the late Mr. Rich having kept apples under a handglass."

The editor of the '*Gardener's Chronicle*' adds in a note, that with this paper he received some excellent pears from Mr. Rivers, exactly answering to his description. Let us add that, while all our own apples rotted before Christmas, a solitary Reinette du Canada apple, left in a light, warm, dry room, underwent no change except shrivelling. How far this plan may answer for late fruit I cannot say; probably the spring sun as it gains power may dry the already half-ripe fruit too much, and it may probably be found that such fruits as ripen from March to June will come to maturity at that season better in the cool fruit-room than in the greenhouse.

MODE OF GATHERING.

All fruit should, if possible, be gathered by the hand, even when it is intended to be used for cider and perry, as the value is much depreciated when it is knocked off and bruised. Two men, with the assistance of a long ladder, will gather a large quantity in a day, one being employed in gathering and the other in receiving the full baskets, steadying the ladder, &c.

Where the fruit is grown for profit, too much care cannot be taken in this process. The persons gathering should touch the fruit as little as possible; they will require baskets holding about half an imperial bushel each, and if the trees are large each man should be provided with a pulley fixed to the ladder, by which to draw up and lower down his baskets as soon as filled, and with a sufficient number of baskets to insure his having an empty one always ready whilst the full one is being taken away to be emptied.

Fruit will not keep if bruised; and as apples and pears may be produced on table every day in the year, it is essential that care be taken in the process of gathering. If such care be taken, and the farmer have a fruit-room wherein to keep his stock in proper order, he will be enabled to take advantage of the best markets, and to sell when it is profitable to do so—to send his fruit properly kept and well matured, and to reap the benefit of

his care by realising the highest prices; whilst his neighbours will have sold their fruit probably at a low price months before, or, if they have a little left, from bad gathering and bad keeping combined, the price they obtain for it will be so low, that the disparity should awaken the most sceptical, and make them turn from their indolent ways and be alive to their own interests. Another great objection to the practice of beating down apples and pears is, that by so doing a vast number of fruit spurs are broken off, and the crops of the succeeding years extensively injured.

DISEASES, &c.

Although not mentioned in the Prize Schedule, the following remarks are added, as they suggest practical appliances by one who has been growing fruit-trees for many years, and the recipes can be relied upon.

The most formidable disease the cultivator has to contend with in apples and pears is the canker, a disease very similar in its action to the king's evil in the human frame, and, I believe, incurable, as it can be traced from the root to the top of the tree, and no pruning will eradicate it. The only plan is to allow the tree to bear as long as it is profitable, and when it will do so no longer, to root it out, and plant a fresh one of some kind not so liable to the disease.

The American blight, or mealy bug, on the apple is the next formidable enemy. This can be cured if taken in time; it requires, however, great care and patience, as it will be sometimes found in the roots as well as in the branches. Should it reach the roots of a young tree, I believe the best plan is to destroy the tree, and take all the soil away and burn it, and refill the hole before planting again with fresh soil from some meadow free from the pest. Should it only appear on the branches or stem of the tree, the following remedy will be found infallible; as, however, this will only destroy what it touches, the trees will have to be looked over frequently to ascertain if any is still left:—

Spirits of tar $\frac{1}{2}$ pint to 2 quarts of water.

The spirits of tar must be first mixed with soft soap into a lather, and the water added, as it will not mix with water alone. This should be applied with a paint-brush, taking care, however, not to touch the leaves with it.

In large trees the following remedy may, if followed up, prove successful; it will, at any rate, materially check the spread of the bug:—Early in spring dig round the stem of the tree a trench 1 foot deep and 18 inches wide; fill this with soot fresh from the chimney and cover in with soil; then mix equal parts by

measure of soot, lime, and cow-dung, with half the quantity of sulphur; add water sufficient to make it the consistency of paint; apply this carefully all over the tree, first scraping off the loose bark, for this harbours many insects. If this should not stop the progress of the bug, the only remedy will be to destroy the tree, as stated above.

I feel quite convinced that all trees in orchards should have a dressing early in spring (*i.e.* some time in March) with some such composition as that mentioned above, first scraping off the lower bark, as it would kill a great number of insects that hide in the rough bark of the tree, if it did no other good. Was not the old-fashioned West of England plan of whitewashing the stem and branches within reach practised for some such purpose as this? I have often noticed it years ago, and it gave orchards a singular appearance in the spring of the year; but depend upon it our grandfathers had some good motive in doing this, for all useful things are not new.

Green fly will sometimes attack the young shoots of apple-trees and also plum-trees, when in a young state. A little tobacco-water and soft-soap diluted with water will destroy this easily.

Black fly on cherries is not so easily destroyed, and it takes considerable care to eradicate it. The following wash will be found effectual, if followed up; the first application may not destroy all the flies, and must therefore be repeated as often as necessary:—

- 1 gallon of strong tobacco-water;
- 4 lbs. of soft-soap;
- 1 lb. of flowers of sulphur.

Mix the soft soap and sulphur together before adding the tobacco-water, or the sulphur will not combine; then add 2 gallons of rain-water, if to be had,—if not, water from the pump will do.

Sometimes a small scale attacks the stems and branches of apple and pear-trees in poor land; a washing of soot, lime, &c., as before stated, with a little clay added to give it a body, and thinly painted over the stem of the tree, yet thick enough to cover the scale, will be found effectual for this.

The fruit of apples for the last year or two has rotted on the tree in many places, and when gathered has decayed immediately: no cause has been discovered for this.

The above includes most of the diseases to which orchard-trees are subject. The only other pest is moss on the stems and branches. A most excellent article appeared respecting this in the 'Gardener's Chronicle' for January 3rd, 1857, page 3, by a much more able pen than mine, and I cannot close this essay better than by giving it "in extenso:—"

"How am I to prevent moss growing on my apple-trees? Shall I scrape

it off? Can I kill it with any sort of wash? Will it come again? Does it do much harm? Such questions as these, though often answered, are becoming so common that it seems desirable to bring them all under one reply at this time of the year, when whatever has to be done should be done quickly.

"No explanation of the manner in which what is called 'moss' can be dealt with is worth having, unless the reason why it comes is clearly understood: we will therefore at once say that moss or lichen grows on the bark of trees for three reasons:—1. The bark is dead; 2. The bark remains without change; 3. The air around it is loaded with moisture.

"It is an invariable law of nature that the surface of a tree dies after a time; this may be seen even in young branches, the skin of which has become brown, for brownness is among plants an absolute indication of death, ferns and some seaweeds excepted. As the branch grows older, superficial death becomes more evident, the bark cracking or crumbling away. In this state it is, physiologically speaking, mere humus or mould, upon which anything will grow, the seeds of which can attach themselves to it and subsist upon the elements of the atmosphere. Lichens fulfil such conditions; their invisible seeds, floating in the air, fall on trees and hold on them by the mere force of attraction, sprout there, incorporate themselves with the bark, and at last grow up into visible plants. Hence all trees may be attacked by lichens, mosses, and similar plants.

"But all trees are not attacked, or at least we see no sign of their being so. This arises from the rapid decay, or the frequent sloughing, of the surface of certain trees; the consequence of which is that the ground, so to say, on which the mosses stand is perpetually slipping from under such incumbrances and carrying them away. The ceaseless expansion of the wood brings this about. This year a branch is an inch in diameter, or 3 inches round; next year it is $1\frac{1}{4}$ inch in diameter, or $3\frac{1}{4}$ inches round. The original surface must therefore occupy $\frac{1}{4}$ inch more than before; but, having been already fully formed, it has undergone no additional growth, nor will it have stretched beyond a very small amount; it merely gives way beneath the internal distension, cracks, peels off, or crumbles away. Under such circumstances, the seeds of any lichens that may have attached themselves to the bark must also fall away without having disclosed themselves. It is when the bark undergoes change very slowly, if at all, that the lichens have time to establish themselves, and to form the shaggy beards that load some orchard-trees. This absence of a sufficient expanding force is owing to the tree having ceased to grow with sufficient vigour: to grow is to form wood; to grow vigorously is to form wood abundantly; to form wood abundantly is to lose surface rapidly; to grow fast is therefore to render the presence of lichens impossible. But we may reverse the description: to grow slowly is to form wood slowly; to form wood slowly is to lose the power of casting off the surface-bark; to grow slowly is therefore in the highest degree favourable to the presence of 'moss.'

"Now, trees grow slowly because either of ill health or extreme old age. The latter is without cure; for the former there is a remedy. Young trees (from 7 to 75 years old) get into bad health from the soil in which they grow being too poor, or too wet, or in some other way unsuited to their constitution. If too poor, manure is a remedy; but this is seldom the case; men rarely plant orchards in sand or peat. It will almost always be found that the fault of the soil is its wetness and its impermeability. The first is attended by a low temperature, and moreover gorges the system of the tree with water, which it can neither throw off as perspiration nor decompose; the second cuts off the requisite supply of atmospheric air, stops rain when the roots most want it, as at fruiting time, and renders it impracticable for the roots to wander freely in search of food. For all this the remedy is deep digging and deeper draining. A moss-grown orchard trenched two spades deep, and drained four feet,

will, in any soil fit for fruit trees, rapidly recover its health and keep it. Under such circumstances wood will form fast, bark will peel off, or crack, or crumble away, and, with the surface, the lichens themselves will also go. At the same time the health of the tree will be restored, and good fruit will follow. But it is not merely because draining relieves the soil of water when injurious, and brings it when the roots most want it, that it is indispensable to the health of orchard-trees; it also acts by rendering the air that rests upon the branches itself too dry to suit the constitution of the lichen. Bark may be dead, and may remain in its place for years, and nevertheless the lichens cannot grow unless they find themselves surrounded by a moist atmosphere. Getting no nutriment, or very little, from the bark itself, they of necessity feed upon whatever the air contains, and on nothing more greedily than on the water there, without which all other agents are useless.

"It is needless to point out the enormous difference in the amount of water floating in air which rests upon undrained and thoroughly drained land.

"Such being the true history of 'moss' on fruit-trees, it is obvious that scraping, and washing, and painting, can have no permanent value, if any. When spending time upon it, it is assumed that the moss is itself injurious. We do not believe that it does any harm whatever. It is merely a symptom of decrepitude, removeable or irremoveable, as the case may be, and a natural warning to gardeners that their trees require better treatment.

"It may, indeed, like rifts in bark, harbour insects, and in such a way be injurious; but this is a small matter, and easily remedied by a scraper. It will, however, be found that, as soon as the improved soil begins to act, no further care beyond skilful pruning and thinning is demanded."

VII. — *On the Practice of Irrigation.* By HENRY TANNER, M.R.A.C., Professor of Agriculture and Rural Economy, Queen's College, Birmingham.

THE important effects which have been realised from the practice of irrigation naturally lead us to look at the causes producing them; and although the principles upon which successful irrigation depends are by no means fully or satisfactorily understood, yet I shall endeavour to explain them, so far as they can at present be looked upon with confidence. The results which render water-meadows valuable are of two classes: an *early production* of food and an *increase of quantity*. In noticing the causes of these effects, we shall not find any conditions but such as are of general application to vegetable growth. The present inquiry will show that they are solely referable to the more complete influence of the same principles which control all agricultural produce. *Early production* is chiefly a question of *climate*. Naturally, this is shown in different districts, in some of which the mild spring weather, being earlier than in other parts, leads to an earlier commencement in the growth. The cold of winter produces a torpidity in the circulation of all vegetation, and from this hybernal slumber it is aroused by the stimulating influence

of spring. As the temperature increases, so we find this torpor yields to the energy of life; hence the function of vegetation recommences, and a further growth is the result. Now there are various modes of producing an artificial climate, and by their adoption we can, to a certain degree, imitate, and thus anticipate, natural seasons. Amongst the various modes of producing an artificial climate, we must place irrigation. Daily observation proves that by its aid we can obtain the growth of spring during the winter months, and I shall now proceed to explain the principles upon which this practice is based.

The surface-soil has two sources of heat: that which arises from internal heat, and that which is thrown upon it by the solar rays. Now, as warmth is necessary for stimulating into activity the dormant energies of vegetation, it may be inferred that, in proportion as we increase warmth, so shall we produce a more luxuriant growth. Facts prove that such is the case. During the months of winter, it is certain that the heat received from the sun is of little importance as a stimulant to vegetation; it is not intended by the laws of nature that it should act at this season of the year, and therefore no assistance can be anticipated from this source. The atmosphere during the winter months, being at a low temperature, offers increased facilities for the warmth of the surface being drawn off and scattered. Experiments have shown that this heat, in leaving the soil, darts upwards in a straight line, and for this reason it may be presumed that if we could intercept the heat as it is passing away a higher degree of temperature would be maintained.

We are all familiar with the various modes adopted in gardens for applying this principle, but it was applied more extensively some years ago by Mr. Gurney. He had observed* that "if a bush or any other fibrous matter were left lying in a field of grass, the vegetation beneath it would soon be finer and fresher than that around it. This fact was generally known, and had been noticed from time immemorial; but the agency by which this increase of growth was brought about—evidently involving some great and important but unknown principle—had never been fully investigated." It was generally attributed to the shelter from the weather, or the protection from cattle, which the bush afforded. This led to a series of experiments being carried out, and Mr. Gurney discovered that if rods of wood, iron, or any other material were supported within an inch of the surface, an increased growth resulted, and the greater the width of the covering material the more evident was the effect. Flags, rushes, straw, bushes, or any similar covering produced the same effect.

* Mr. Gurney to the North Cornwall Experimental Club, June 7, 1844.

Reeds or wheaten straw applied over the grass, at the rate of about a load or a load and a half per acre, in a very short time increased the quantity of grass to an incredible extent. The various grasses under these coverings were found to be healthy, and rapidly passed through their stages of growth: some growing, some flowering, some seeding. Mr. Gurney also gives the following experiment:—

	Covered, per Acre.	Uncovered, per Acre.
Grass laid up 15th April, cut 30th May, produced	5870 lbs.	2207 lbs.
Clover ley, from 2nd May to 2nd June, produced	3460 lbs.	960 lbs.
Trefoil in above	3½ in.	1 in.
Clover in above	6 in.	1½ in.
White Dutch in above	1 to 2 in.	none.
Loss of water in making into hay	½	½

An increased number of experiments tended to confirm the preceding, but they added this important fact—that the increase of growth was in the same ratio as the varying degree of fertility in the soil. Thus Dr. Vacy says*—

“On some coarse moors the increase of growth was very slow, as compared with other soils. It was found that the rate of action was also influenced by artificial manuring, and that the increase of vegetation was in a ratio with the natural quantity that would be produced by a given manure when laid on a field and not assisted by the operation of any fibrous coverings. A certain quantity of stall dung, which would double the quantity of grass when laid on in the usual way, was found to increase it *six* times when properly treated with fibrous covering. I made a careful analysis of the herbage produced by this action, and also that of the same ground left open, and the results were the same. The fattening proportions seem to be equal, weight for weight. They were tried on feeding-cattle, milch cows, and store stock.”

The mode of applying this to practice is exceedingly simple. A ton, or rather more, of straw, rushes, &c., is spread evenly on the grass, and raked up into heaps at the end of two or three weeks—in fact, as soon as the grass begins growing above the covering; and the produce is either consumed, or the covering again applied after one or two weeks' delay. There is no doubt but the value of this process chiefly arises from the warmth of the soil being increased by the protecting agency of the covering of straw.

Another peculiar circumstance connected with these experiments is, that a portion of grass-land covered during the day and left uncovered during the night produced a luxuriant herbage; whilst on another portion, which was uncovered by day and covered by night, a sickly and inferior herbage was produced. This, however, I believe, is referable to the fact of the growth being (in the former case) stimulated whilst the action of light

* Journal of the Royal Agricultural Society, vol. vii. p. 279.

—although subdued by the covering—could influence the change in the sap, and produce a healthy growth. In the latter case, the period during which the growth of the grass was stimulated being night, the sun could not complete the change in the sap, and the result was a sickly yellowish growth. From other experiments, it was shown that rods both opaque and transparent—rods of wood and branches of trees—all produced similar results. Although the practice of fibrous coverings and irrigation are distinct, still the same principles operate, to a certain extent, in both. In like manner as by the use of various coverings we intercept the loss of heat, and thus raise the temperature of the soil, so also does the *shield of water*, supplied by irrigation, act. It promotes the growth of grass by the warmth retained at the root of the plant. The value of retaining the warmth of the soil will be rendered evident by a reference to Mr. Whitley's paper on the Climate of the South-west of England,* showing the regularity with which grass land maintains a temperature higher than the atmosphere above it. In consequence of this higher temperature, it is clear that grass land must lose much of its heat when exposed to the action of the colder atmosphere, and hence the value of protecting it by a shield. It is done by the fibrous coverings, and the same end is gained by the use of water. This is not the only mode in which the temperature of the soil is influenced by irrigation. If the water supplied be of a higher temperature than the air, it not only acts as a covering, but it also imparts some of *its own warmth* to the soil, and thereby operates more powerfully. River-water is almost always of a higher temperature than the air, whilst springs and brooks are even warmer than the rivers. It therefore follows as a natural consequence, that the greater proportion of water available for irrigation is of some value in this respect, whilst, owing to their greater warmth, many springs are of considerable value. The warmest springs have the deepest sources, their temperature being raised by the internal heat of the globe. In like manner, water from the deepest Artesian wells has been proved by Arago † to be hottest. The temperature of hot springs varies from 209° Fahr.‡ downwards, and we have every variation down to those which approximate closely to the temperature of the air. In the following Table (Bath and West of England Journal, vol. iii. page 141), Mr. Whitley has given the temperature of ordinary spring water, under 300 feet of altitude, in the south-west of England, and to this I have added the temperature of the air.

* Bath and West of England Journal, vol. iii. p. 136.

† 'Annuaire pour 1835,' p. 234.

‡ Humboldt's 'Cosmos,' vol. i. p. 218.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.
Spring water. . .	51	51	50	51	52	53	53	54	54	55	53	52	52.5
Temperature of the air	44.9	37	44.4	50.5	53.4	57.6	60.5	60.5	57.7	51.1	50.9	49.3	51.5

Mr. Smith has also given * some observations respecting the temperature of some springs on Exmoor which are interesting.

	Jan. 24th, 1854.	Sept. 4th, 1854.	Dec. 20th, 1854.
Temperature of Picked Stones Springs ..	47½	49	47½
Temperature of a spring above River Exe ..	46	46½	46
Temperature of the air	40	65	39

It is therefore not surprising that Mr. Smith should have described in the following terms the effect of this warm water being spread over the surface. "Nothing can exceed the effect produced below the 'Picked Stones' spring; and the growth of the succeeding grasses, from stage to stage, clearly demonstrates the cooling of the stream as it becomes assimilated to the air." Facts most undeniably prove that the warmth of the spring adds to its efficacy when used for irrigation.

We may therefore safely take it as a principle, upon which successful irrigation depends, that we thereby produce an artificial climate in the soil both by retaining the heat constantly given off from the earth in the cold months of the year, and also by adding to it the supplies of warmth which the spring water may contain. It is on these principles that we must explain the beneficial results arising from the water when the only qualification possessed is that of warmth.

Increased produce is another result of the practice of irrigation. This is induced partly by the causes already noticed, and partly by the effects of water as a manure co-operating in the result. This, however, depends upon the composition of the water; its use is simply that of a liquid manure. The ingredients thus presented to vegetation possess fertilizing properties, and the minute proportion in which they are presented is compensated by the large bulk of water used. Some springs are very free from such ingredients, but by far the majority take various matters into solution in their passage through the rocks from which they rise. It is therefore clear that the character of the water would

* Journal of the Bath and West of England Society, vol. iv. p. 297.

be influenced by the rock through which it may pass. In practice we find a few ordinary tests used by experienced gutterers, and from these they draw tolerably correct inferences as to the adaptation of a spring to purposes of irrigation. Water having a soft and greasy feeling is generally preferred, and persons with only moderate experience can readily recognise that which is suitable to the purpose. This arises from the presence of the alkaline salts (potash and soda), and with these we generally find silica and phosphoric acid. This quality, which is also determined by the power of the water to dissolve soap, is called "softness." The opposite quality is known as hardness, and is very generally objected to, though there are exceptions, as in the Gloucestershire, Wilts, and Hampshire meadows, the chief parts of which are supplied with hard water alone, and yet very marked results are produced from the use of it. Some water contains organic matters which increase its value as a fertilizer, others are entirely dependent on inorganic matters. Whatever may be the substances the water contains, we may anticipate the same results from their use as if we were employing them as ordinary manures, with this exception, that by virtue of their diffusion throughout a large bulk of water, the benefits resulting will probably be much increased. If we have phosphates, alkalies, or organic matters, each has a special action as a fertilizer, and their solution in water only renders their action more prompt.

Another criterion of good water for irrigation is the fact of its having good trout. The growth of watercresses is also considered an indication of quality. These probably result from causes already stated. They are, at all events, clear indications of a healthy character of water, alike congenial to animal life and vegetable growth. These are generally found in that clear and bright water, which is much to be preferred for irrigation. There are some instances showing the advantage of turbid streams, but the cases are exceedingly rare in which meadows are not more improved by a clear and bright stream. Thus many streams, which are apparently worthless, contain in them the elements of fertility, which the unpractised eye fails to detect, because they are clear and transparent; but an analysis reveals the treasure they contain, and when judiciously applied to the land, the increased luxuriance of the herbage proves the value of the hidden fertilizer.

The value of natural springs has been much increased artificially, by adding to them various manures, in fact, by changing them into streams of liquid manure. In this manner various kinds of fertilizing matters have been distributed over the land. Farmyard dung, guano, and other artificial manures have thus

been distributed most economically and effectually. The economy of the distribution results from the motive power being simply the gravity of the water, whilst the effect has been great, because the materials applied, in consequence of being in solution, are immediately available for plants. Instances can be shown of land of the poorest character being thus rendered valuable. For example, a rabbit warren on the sides of the river Mann was converted by the Duke of Portland into the far-famed Clipston Meadows, now producing an annual rent exceeding 11*l.* per acre.

The fertility of the land is increased by the passage of water *through* the soil, as well as over it. A careful inspection of irrigated land will convince any one of the fact that not merely surface-drainage but under-drainage is essential to success. If the water is to act fully on the land it must pass *through* the land. Such is the evidence of practice: now what is the cause of this practical necessity? The explanation may be found in Professor Way's 'Researches on the Power of the Soil to absorb Manures,' published in the Journal of the Royal Agricultural Society;* they are deeply interesting and of considerable practical value. He has shown that in the passage of liquids holding manures in solution through the soil, the soils have the power of abstracting these manures from the water, and storing them ready for the use of the plants. Thus water, which is perfectly colourless, and *apparently pure*, may be deprived of the alkaline salts, the phosphates, &c., contained in it, by this peculiar absorptive power, and when so separated it is jealously preserved from loss until required by growing plants. Now experience has proved that *the water should pass over the surface as far only as it is necessary for its distribution*, and after this point is gained *the more fully it passes through the soil the better is the effect produced*.

To show the completeness with which Professor Way's experiments illustrate this peculiar property possessed by soils, a few examples are adduced.

Experiment 43.—Solution of caustic potash was thrown into a 10-inch filter of Mr. Pusey's soil; the liquid, after percolation, contained no potash in any form, it must therefore have been arrested by the soil.

Experiment 45.—20 grains of carbonate of potash were dissolved in 8 ounces of water. It was poured upon a filter bed of Mr. Pusey's soil, 10 inches in depth; the results were very satisfactory, and proved the total separation of the carbonate of potash by filtration.

Experiments 52, 53, and 54.—Lime water of moderate strength

* Vol ii. p. 313.

was poured upon three different subsoil clays of the gault formation obtained from Mr. Paine's land at Farnham; in all these cases a large quantity of lime was arrested.

Experiment 62.—The ash of Peruvian guano (which is principally phosphate of lime) was dissolved in diluted sulphuric acid, an excess of the phosphate being employed. The solution *was made clear by filtering through paper*, and was then thrown upon a filter-bed of Mr. Pusey's soil; when 8 ounces of liquid had passed, the solution was tested, but no phosphoric acid could be detected in it.

Experiment 93.—Mr. Huxtable's light soil was mixed with its own weight of white sand to make it more permeable. Upon this filtering-bed a quantity of highly offensive tank-water was poured. The liquid did not pass for several hours, but ultimately more than 1 ounce of it passed *quite clear and free from smell or taste*, except a peculiar earthy smell and taste derived from the soil.

These experiments show how perfectly the soil is able to remove from water the fertilizing matters contained in it, and prove that the important influence of under-drainage arises not only from the *ordinary* beneficial operation of removing stagnant moisture, but especially from the food of plants which is arrested as the water passes *through* the soil. There is no reason to believe that liquid simply passing over the surface can do more than protect from the cold, and perhaps add warmth to the soil; but it cannot thus nourish as a fertilizer. We might as well expect food applied to the lungs of an animal to be as nutritious as when passed into the stomach and digested. The food for the plant's growth should enter from the roots, and it is evident that a simple passage over the surface does not fully accomplish the result aimed at. Another important point which receives explanation by this discovery is, that provided the under-drainage is in an equally efficient state in each case, the advantages of irrigation will be evident and beneficial in proportion to the quality of the land. As the increase in the quality of the land is usually accompanied by a large proportion of clayey matter, we find at once a reason for the soil being able the more completely to separate the fertilizing ingredients existing in the water. Thus science confirms the character which practice has given to such soils as regards their power of "holding manures." These appear to be the principles which operate in the irrigation of land; we will now proceed to see how they are applied in practice.

In the formation of water-meadows, the first point is *the selection of water* which will be beneficial to the land for which it is available. Here, as in almost every other case, local experience is necessary; for no fixed laws can be named when the circum-

stances under which they may be applied vary so entirely. I have already named the qualities generally considered desirable in water to be used for irrigation. If it be a warm spring it is almost sure to be useful, and when, in addition to this quality, it has a soft alkaline character, then there is still less doubt of its being valuable. But it need not be rejected, though possessing neither of these qualities; for I have shown that hard water, as well as that of the ordinary temperature of our streams and rivers, has been found valuable for irrigation. Neither can the possession of the most desirable qualities be relied upon as giving a certainty of success in its employment, since climate may be unfavourable to its use. It is therefore important, before the land is irrigated, that local experience should determine the probable result. A small experiment will probably be satisfactory in districts where irrigation is not general. The districts in which it is practised are chiefly in the west and south-west of England; but there appears no reason why these should not be extended. In Devon, Somerset, Wilts, Dorset, Hampshire, and Gloucestershire, irrigation is very largely practised; and to a smaller degree in Worcestershire, Berkshire, and Nottinghamshire. There is every reason to believe that with judgment and discretion a far larger breadth of land may be brought under this valuable fertilizing agency.

Experience has shown that some streams are fertilizing, some harmless, while others are positively injurious. The last character arises in many cases from the presence of lime, and in others it is caused by magnesia and iron. The presence of lime is prejudicial to some soils only, whilst on others it has a beneficial effect; but magnesia and iron are far more constant in their action. Thus the drainage from a bog is very unfavourable, and should always be avoided;* for although it may become less and less injurious from the passage of air through the soil, still it will seldom, if ever, possess valuable qualities. If a stream is harmless it may often be rendered valuable by the addition of manures; and in like manner other springs may be increased in value by the same process. This has been done extensively on Exmoor by Mr. Robert Smith, who has had cheap sheds erected so as to wash the manures over the sides of the hills below; thus making the stream a distributor of manure. This is not only accomplished without horse labour, but the manure is carried where no horse could convey it, and applied in the manner most beneficial to the herbage. In such cases the

* Bogs are usually situated below and caused by springs issuing from behind a tight rock. In this case, if the spring be tapped (above the bog) the bog will be cured, and the water will be at once available for irrigation.—R.'S.

manure reaches the plant in an *unfermented* state,* which has been considered undesirable, but I am not disposed on this ground to condemn the practice, for it is possible, as we learn more fully of the absorbent powers of the soil, that we may find due provision made which will secure all its advantages. But whilst I cannot say that a loss results from the prevention of fermentation, the practice of other districts leads me to anticipate that some advantage may arise from combining fermentation with this mode of distributing manure.

In the preparation and fermentation of liquid manure we have certainly much to learn from our foreign neighbours. Professor Johnstone, in his 'Tour through Denmark, Sweden, and Russia,'† speaks of the dairies near Hamburgh, where particular care is taken of liquid manures, which, after arriving at a certain degree of fermentation, are pumped into a stream for distribution over the meadows; and he very justly adds:—"A farmer would not tolerate a servant who wastes his grass or hay intended for his stock, yet *he who wastes liquid manure wastes hay*, diminishes not only his present profits, but his chance of future gain." We must, however, look to the Netherlands for the long-established and much-valued practice of preserving and fermenting the liquid manure of the farm. Here it would appear to be a most important point of practice, every farm having its liquid manure-tank. For instance, a farm of 30 acres would probably have a tank measuring 1200 or 1400 cubic feet, built of bricks, secured against loss by drainage through the sides or bottom. In such tanks there is generally a division, unless the farm has a second receptacle. Whilst the liquid is accumulating in the one, that in the other is quietly fermenting; and one result of this chemical action is the conversion of urea into salts of ammonia. Neglect and exposure, however, cause loss. For this reason, in considering the relative merits of the tank system,‡ and the use of recent manure, we must remember that, even if practice proves fermentation to be preferable, care should be taken to avoid the loss of the ammonia by neglect and bad management. The fact of this process being an old-established practice, is certainly an argument in its favour. In China the tank system is of great antiquity.

If we have a stream of water which is either harmless or only of small fertilizing value, we have the means at our command of increasing its value by the addition of some of the manure of the

* My manure is fermented.—R. S.

† Journal of Royal Agricultural Society, vol. iii. p. 400.

‡ The tank system is in effect the same principle as "ponding" the waters in North Devon. Even small streams are thus made to irrigate many acres, and the water is much improved by fermentation.—R. S.

farm either liquid or solid, and also by the addition of artificial manures or other fertilizing matter. In this manner, Mr. Smith, of Exmoor, has used the water-gutter for the distribution of good soil. In carrying out the catch-gutter system on the hill-sides, it often happens that they cross some deposits of rich mould lying between the hills, from which it has been originally washed. Advantage is taken of a strong supply of water flowing through the gutters, and the soil is thrown in and thus distributed in an even coat over the grass skirting the next hill. Thus, at a trifling outlay, he gives a rich coat of fertilizing matter which affects the growth of herbage in a very marked degree. Another point in Mr. Smith's practice is worthy of notice in laying out any extensive water-meadows, and that is, *making the fences on the water-line*, so that the ditch may be made a carrier. Much land is thus saved both above and below the fence, and its irregular outline is of no importance after it is laid down in permanent grass.

The water supply having been duly considered, we next proceed to its distribution over the land. In doing this, two points are to be kept prominently in mind—viz., to convey the water over as large a surface as is practicable, and to secure a fall over the surface.*

Before leaving this part of the subject I must notice Lord Hatherton's meadows at Teddesley, in Staffordshire, because there is much interest connected with them, from the fact of their being irrigated with drainage water, not from sewers, but from very wet land at a higher level. The circumstances are these:—About 200 acres of very wet land situated on the highest portion of the farm at Teddesley had for its improvement and cultivation to be thoroughly drained. In doing so several strong springs were tapped. These when combined produced a permanent and abundant fall of water. This stream has been conveyed to the farm-buildings, where it works a mill-wheel 38 feet in diameter, and gives a power equal to 12 horses. This power is employed for grinding corn and malt, sawing carpenters' work, chaff-cutting, threshing, and other farm operations. After being used in this manner, it is conveyed away for the purpose of irrigating 120 acres of meadow land below. The originality of the application of water, which was previously productive of so much injury to the land when stagnant, but is now rendered valuable as a motive power and for irrigation, is perhaps scarcely equalled.

* The author proceeds to describe the various modes of distributing water over the land—viz., the flat valley meadow of Wilts, Hants, and Dorset; the old catch-meadow of Devonshire, and the new system of Mr. Bickford. This essay was written before the publication of a paper on Water Meadows, in vol. vi. of the Journal; the portion of the present essay which treats of the laying out of meadows is therefore omitted.—ED.

TANNER on the Practice of Irrigation.

the fact of water from drains being useful and valuable irrigation seems to contradict the statement already made regarding the power which soils possess of abstracting from water fertilising matter contained in it. If this principle holds, it may be very naturally asked, why does any fertilising matter remain in the water after coming from the land? It is some years since I personally inspected these meadows. At that time the absorptive power of soils was little understood and no local examination was made. A question of much interest is certainly involved herein, and it would be pleasing to have it fully investigated. I do not, however, consider that it is contradictory as has been represented: it appears to me that the explanation lies in the fact that many fresh springs were condensed away in the drainage *which had never passed through the soil* and hence could not have come under this influence. Had the entire quantity of drainage water passed through the soil from the surface, very different results would have been seen; but if, I presume, it arises from fresh springs being drawn off into drains, the question no longer rests on the absorptive powers of the soil.

The next point connected with the formation of water-meadows is the selection of the grasses most suitable for growth:—

Glyceria aquatica (or *Glyceria aquatica*). This water-meadow grass, also known as the reedy sweet-water grass, is a valuable grass for irrigated land, as it has a *rapid growth of good quality*.

Glyceria fluitans (or *Glyceria fluitans*), floating sweet-water grass, ripens *very early* in its growth, and for this reason is generally sought after in seeding new meadows.

Phalaris trivialis, rough-stalked meadow-grass, although not particularly early, is yet *productive*, and very desirable for water-meadows.

Phalaris stolonifera, florin grass or marsh bent, takes a high rank as a water-meadow grass. It is very productive, and affords *both early and late* herbage of good quality. It always grows rapidly, and maintains a firm plant.

Cynodon dactylon, meadow foxtail grass. Its *early, abundant, and rapid growth*, together with the excellent qualities of the produce, place this among our best grasses for meadows; and it is very well for water-meadows, *provided* the management

is judicious. *Phalaris elatior*, tall meadow-fescue. This grass, although not so in its nature, is *relished by stock*; it is, however, well adapted to land which lies low.

Phalaris pratensis, meadow fescue. The produce is *abundant* and of coarse quality: the *quality is excellent*, and its growth

Lotus major, great bird's-foot trefoil. Moist situations are its natural localities. It yields an abundance of nutritious food, and is much sought after by stock.

Trefolium hybridum, hybrid clover, is not grown as much as its merits justify; it is highly esteemed on the Continent, and where it is grown in this country it answers very well. It is the most suitable of all the clovers for a water-meadow.

Phleum pratense, meadow cat's-tail or Timothy-grass. The growth of the grass is both early in the spring and late in the winter; it produces an abundance of herbage, and the quality is exceedingly good.

These are the principal grasses which are suitable for irrigated land; and the following mixture of these seeds, which has been recommended,* appears to be a judicious receipt:—

	lbs.		lbs.
<i>Agrostis stolonifera</i>	2	<i>Lolium perenne</i>	12
<i>Alopecurus pratensis</i>	2	<i>Phalaris arundinacea</i>	2
<i>Festuca elatior</i>	2	<i>Phleum pratense</i>	2
„ <i>pratensis</i>	2	<i>Poa trivialis</i>	3
„ „ <i>loliacea</i>	2	<i>Lotus major</i>	2
<i>Glyceria aquatica</i>	1	<i>Trefolium hybridum</i>	1
„ <i>fluitans</i>	2		—
<i>Lolium italicum</i>	8		43

These seeds should be sown on the land after it has been well cleaned and brought into good order by previous cultivation. The surface must be gently harrowed and then rolled, the birds kept off, and with ordinary care a good plant of grass will soon establish itself, producing herbage of the very best quality. No water should pass over the surface until the soil has settled firmly and the grass is strongly rooted. The water gutters may then be cut according to the plan decided on, and the irrigation may proceed as usual.

It scarcely comes within the limits of the present subject to notice the growth of Italian rye-grass under the action of liquid manure; but it does appear to be desirable that its growth should be tested under the ordinary system of irrigation in the same way as the meadow-grasses. In Piedmont, where it is grown under a similar system, the results have been most encouraging and satisfactory, and no doubt a long-continued attention to the growth of the Italian rye-grass has tended very much to give the seed of this district its present high position in the market. Wherever it is tried, it should be alone and not mixed with any other grasses. The latter never come to maturity so early, and consequently they are grown at great disadvantage.

The management of water-meadows is a most important matter,

* Morton's 'Encyclopædia of Agriculture,' vol. i. p. 1001.

and upon it much of their success depends. It is seldom carried out with proper zeal and *attention*, for we often find ignorance and neglect causing considerable loss to the occupiers of the land. The entire system is eminently simple, though frequent attention is necessary to success. The season may be said to commence at the end of September or the beginning of October. During October, November, and December, the water is applied as freely as possible over the meadows. The supply of water may be kept on the land at this time of the year for two weeks, and then turned off to other ground for three or four days. The rapidity with which the land is flooded must depend upon the quantity of water to be disposed of and the extent to be watered. The object should be to keep a *thin coat of water passing gently and continuously over the surface*.

When the water is going to be taken off, the state of the weather should be carefully observed. If, for instance, the water were taken off at evening, and this were followed by a hard frost, we should have the tender grass completely cut up, and all the benefit from the previous watering would be lost. When the water is turned off in the morning and the day proves fine, the grass becomes dry before night and the frost cannot then injure it much; still with the prospect of a frost it were even safer not to turn off the water. If the water should happen to freeze on the land, the water should at once be stopped, for with a coat of ice upon the ground the continued flow would be undesirable: the coating of ice would in such a case act like a fall of snow and keep the ground warm. It is, however, by no means desirable for this to happen, and it is generally attributable to a scanty supply of water. When a piece of grass happens to have had the water turned off three or four days and a frost comes, it is better not to put the water on until the frost is gone; but if the water can be got over the ground *before the frost comes*, it will be a great protection to the land. It is the same with a frost coming on wet grass as with the ordinary white frosts: more injury arises because the herbage is moist than because of the absolute cold. After the interval of three or four days the grass will again be ready for eight or ten days' more watering.

If very early food is wanted for ewes and lambs, some of the ground may be laid dry for use in the early part of February or even in January; by the 1st of March a large proportion would be ready for feeding. The watering will of course be kept up as described until a week or ten days before the sheep are turned on the ground, thus giving the grass every opportunity of making its growth, and the land of getting firm and dry for stock. Heavy stock should not be turned in until the ground is thoroughly firm, otherwise they injure the land by treading. All the ground which

is fed off before April may be watered and fed again before laying it up for grass.* As a rule the meadows are fed down and laid up for grass about the 1st of May; but this system is open to objections. I prefer laying them up *in succession*; some in the middle of April, and feeding other portions up to the end of May. In this manner the extent of grass cut for hay is more under control—a very important point in a West of England climate.

As soon as the meadows are clear of hay, the watering may again commence; but the water must not be kept on as long as previously.† A week is the usual time; but when the white scum appears, we may know that the water has been kept on too long. In this way there will probably be a good cut of grass ready in five or six weeks. This crop being cut and secured, no time is lost in commencing the irrigation; but as the weather gets hotter, so we are obliged to be content with shorter waterings. The growth, however, is more rapid now than at any other time, and by alternately turning the water on and off for two days in succession, we have an incredible rapidity of growth. This produces a valuable aftermath, which is fed during the months of August and September: after this the meadow-gutters are thoroughly examined and cleaned, and the land is ready to recommence the duties of another year. When there is a sufficient extent of meadows, it is an excellent plan to keep the management entirely in the hands of a skilful and attentive waterman, and under any circumstances it ought to be a part of the duty of *one* particular man, who should be responsible for its performance. The superintending care of a farmer cannot always be available for directing. He may be on business; but the “drowner” (as he is sometimes termed), when he understands the main points to be noticed and attended to, should be held responsible for the right performance. The annual expense of managing water-meadows may be said to vary from 4*s.* to 6*s.* per acre.

Incidentally connected with the management of water-meadows, I may observe that in consuming the grass with sheep a very great economy of food will be evident if they are regularly folded over the ground. Every morning a fair day's consumption should be added to the fold, and the back hurdles should be brought forward in proportion. The sheep should not be *cramped* up; at the same time they should be kept within proper limits, and as soon as a certain portion of the field is fed off, the water should be turned on *gently*, and thus the manure will be immediately

* The April watering is most beneficial on Exmoor: this arises from the improved temperature of the air.—R. S.

† The better practice is to damp the land only: summer watering, especially in late spring, being found injurious to the grass.

carried into the ground. It has been generally found that by folding the land one-third more sheep can be kept; but I believe we may go further and say that 50 per cent. more sheep may be kept on the same extent of grass. The fertility of the land will determine the quantity of sheep which these water-meadows will carry. Mr. Pusey gives an instance of an *average*-quality meadow carrying thirty-six sheep per acre for five months. The system of folding was here carried out, and this materially increased the number of stock kept. As a rule, store sheep are only put in water-meadows in the spring, and the aftergrass is consumed by bullocks and fattening sheep. Some meadows will give the sheep the rot in the autumn, whilst others are perfectly safe. Of course, local experience alone can decide this point.

The making of water-meadow hay requires especial care, because of the peculiar character of the grasses. It is not necessary or desirable to expose it longer to the sun than ordinary meadow hay; but, with one exception I would mention, I should adopt the same system for making hay as is recommended* for ordinary grass land. Having carried the drying of the hay as far as you deem it necessary for putting into large cocks, I find it best to make these cocks larger than usual, and allow them to stand for two or even three days. If they have been nicely made and raked down, no fear of injury from rain need be entertained. At the end of this time let them be exposed to the sun and air for a few hours; thus all the concealed moisture will have been brought out by the sweating the hay has had, and it will soon give it up to the sun and air. I find this far better than a prolonged exposure to the sun, which destroys the colour and even then often fails to dry up the sap. When the outside of the stalk has been rapidly dried, the juice often remains inside beyond the reach of the sun, and this produces future trouble. If, however, we get hay in a regular sweat, then it comes to the surface and can soon be evaporated. With this exception, the process of haymaking may be carried out in the usual manner.

In producing an increased crop by means of irrigation, it becomes important to know to what extent this advantage is counterbalanced by any decrease in quality. The general impression amongst practical men is, that although the grass is more succulent or juicy yet the quality is good, and stock improve rapidly upon it so long as they can be kept from scouring.† For this purpose it is usual to allow sheep and lambs some hay whilst they are on water-meadows, especially in the early part of the

* Bath and West of England Journal, vol. v. p. 83.

† I have found good effects arise from salting "water-meadow" hay. The cattle eat it with greater avidity, and it is more healthy for them.—R. S.

season, and with this dry food their progress is most satisfactory. Such is the invariable evidence of practice: for an explanation we look to the teachings of science.

The most accurate and reliable series of chemical observations on the composition of various grasses is that published by Professor Way.* The following are his analyses with reference to water-meadow grasses:—

				Per cent. water.
Grass from water-meadow, gathered April 30th, contained ..	87	58		
Do. do. do. June 26th ..	74	53		

To show the comparative proportion of water in this and other grasses produced on dry land, I have arranged the analyses of the general grasses so as to show the water which the grasses of *each month* contain, and as all specimens were examined when in bloom, it follows that their collection extended at intervals over three months.

Water contained in grasses gathered from dry pasture land in—

MAY.			JUNE.			JULY.		
Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
80.35	76.62	78.7	80.2	51.85	67.74	72.65	52.57	61.39

Thus we see the quantity of water in our grasses steadily decreasing as the weather becomes hotter:—

The average for May is 78.7 per cent. of water.
„ June is 67.74 „
„ July is 61.39 „

This is, no doubt, referable to the influence of the sun's rays causing an increased evaporation during the warmer weather, whereby a denser sap circulates and a less succulent growth ensues. Upon comparing these estimates with each other, and making allowance for the earlier period at which the meadow-grass was gathered for examination, we may fairly consider the grass of irrigated land to contain about 7 per cent. more water than the grass of dry meadows. This at once explains the beneficial action of *dry* absorbent food, such as hay; and it also shows why a small quantity of hay is found sufficient to counteract that tendency to scour which the more juicy food naturally induces.

In pursuing this inquiry it is necessary to estimate the relative value of the dry matter which remains in both cases, and in

* Journal of the Royal Agricultural Society, vol. xiv. p. 171.

order that we may fairly test the relative produce from dry and irrigated land, we must examine the *same* grasses grown under both circumstances. The grasses which composed the herbage of water-meadows examined by Professor Way consisted chiefly of *Poa trivialis*, *Holcus lanatus*, *Hordeum pratense*, *Avena prænensis*, and *Lolium perenne*. As these were gathered at different times, the proportion of water would differ irrespectively of the natural character of the grass. It will, therefore, be better to see the comparative composition of the dry matter in each case. This I have arranged in the following table:—

—	Flesh-forming Principle.	Fatty Matter.	Heat-producing Matter.	Woody Fibre.	Ash.
<i>Poa trivialis</i>	9·8	3·67	40·17	38·03	8·33
<i>Holcus lanatus</i>	11·52	3·56	39·25	39·30	6·37
<i>Hordeum pratense</i>	11·17	2·80	46·68	31·67	6·18
<i>Lolium perenne</i>	11·85	3·17	42·24	35·20	7·54
Mean of the above	11·08	3·17	42·08	36·05	7·11
Water meadow (April)	25·91	6·53	32·05	25·14	10·37
Ditto (June)	10·92	2·06	43·9	34·8	8·82

From this will be clearly seen the cause of stock thriving so well on the herbage of our water-meadows, for a surprising difference is manifest between the nutritious and fattening powers of early water-meadow grass and the grass from dry meadows. It is also worthy of note that this character is not maintained through the latter part of the season: the June crop more nearly approaches it in composition. We may, therefore, safely accept the concurrent evidence of practice and science,—that water-meadow grass is more juicy in its nature, more abundant in its produce, and of better quality than the herbage of dry meadows.

Looking abroad for the manner in which irrigation is practised, we find many singular examples of the great value set upon water for this purpose. In India and China the greatest amount of labour is expended in procuring, preserving, and using the water. Thus in Bengal we find instances of wells being dug on the higher portions of tillage fields, from which the water is raised in leathern bags by the aid of bullocks. When the water is raised, great care is taken of it. The land having been previously divided into level squares, according to the slopes of the ground, the water is conveyed into a small channel around it, from which it soaks away into the soil enclosed, and thus each square is successively watered by *percolation*, and not by surface flooding.

In Patna, the water being less deep, is raised by a long lever, but the leathern bucket is still employed.

In Affghanistan water is conveyed for miles by subterranean canals. Shafts from the surface are frequently made into them for the purpose of removing the excavated earth, and they are subsequently kept open so as to act as *wells* for the land under which the canal passes. When the canal re-appears at the surface, the water can be more freely used for irrigation, and thus luxuriant vegetation often appears immediately below the snow-clad hills.

In Mexico irrigation is also practised, but in a very negligent manner.

Switzerland has many instances of successful and skilful irrigation, especially in the cantons of Aargau and Berne. The system here adopted is carried out with even more skill than is generally shown in England. They begin earlier than we do, as they are compelled to stop irrigation as soon as the mountain snow-streams begin to flow. Indeed, this current being exceedingly low in temperature, is very injurious to vegetation; consequently if the water receives any addition from the melting snow on the hills, its use is entirely discontinued as spring advances. The meadows, having been encouraged by three or four months' previous irrigation, are brought forward by the genial climate of spring to early maturity, and often produce $2\frac{1}{2}$ to 3 tons of hay per acre.

The practice in the Netherlands partakes largely of the character of liquid manuring; indeed, the accumulations of liquid manure are there distributed by the aid of running water.

In Lombardy irrigation receives very considerable attention. For many centuries it has been practised there, and still it claims pre-eminence. The state claims the right to the water, and sells the right of use, for one, two, or more hours daily, to those requiring it; but the payment is far below the value arising from its use. How truly may we say that irrigation is more highly valued there than in this land, where the streams are free, and (with the exception of occasional rights) at the disposal of those bordering upon them! In Lombardy the water is used not only for grass land, but also for other crops; and it is by no means improbable that ere long we may in this country see manured-water similarly applied to the cultivation of crops. Thus we shall be adopting one of the most ancient of the practices still carried out by the Chinese and other Oriental nations; and when to this I add that some of the best water-meadows in this country—such as those in Gloucestershire and Wiltshire—are reputed to have been made by the Romans, it shows that the practice of irrigation has not made any very considerable advance during the last fifteen centuries.

VIII.—*Agriculture in France.* By EDWARD SPENDER,
Mannamead, Plymouth.

A PERIOD of political revolution is the worst of all times for the consideration of social reforms. Amid the glare of burning cities and the tumult of contending armies, the Reformer has small chance of making himself seen or heard. It may be stated as an invariable law, that social improvements progress in inverse proportion to the frequency of political convulsions. It is not to be expected that that land will be highly cultivated which lies on the slope of a volcano and in the direct course of the lava-current. We shall not, therefore, be surprised if, after a brief investigation of the condition of French Agriculture, we find that in many things our neighbours are very much more in the rear than might have been expected of a country which ranks with the first in the world. In a nation whose revolutions occur every decade—nay, even more often, as Talleyrand, prince of diplomatists, who “swore ‘eternal allegiance’ to eleven constitutions,” has testified—the statesmen will have been too intent in framing schemes of government to descend to the less interesting though more useful details, which have far greater influence on the general happiness and prosperity than all the first principles of statecraft. Now that France is enjoying—enduring rather—a respite from the crucial experiments of system-makers, she is wisely employing her unwonted and compulsory leisure by an inquiry into the present condition and future improvement of her agriculture. That this is a most important inquiry, statistics will prove. The number of able-bodied men in France is about eight millions. Of these, six millions are cultivators of the soil; that is, a sixth of the whole population. In England only one-tenth of the whole population is agricultural, and this proportion includes women and children. If we add these to our estimate, we may infer that at least one-half of the inhabitants of France are connected with the land.* Where so large a proportion of the population is directly interested in one pursuit (the whole nation is, of course, indirectly influenced thereby), it becomes important to note from time to time the progress that has been made in it. This matter has likewise its interest for ourselves. In the great body politic the commercial prosperity of one member is to the advantage of all. No great stretch of imagination is needed to suppose that if, instead of being one vast “encumbered estate,” France had been properly cultivated,—if in place of a squalid

* The actual figures, according to the census of 1851, were, 14,318,476 *agriculteurs*, out of a total population of 35,783,170. This does not include any of the “women and children at the charge of their husbands and parents,” who with the unclassified population make up 12,245,782.

people striving to keep off starvation by bread made of grass and bark of trees, and having for answer to all complaints "a new gallows forty feet high,"*—there had been before 1789 an industrious, well-fed, orderly nation,—England would have been spared nearly thirty years of battle, thousands of her sons, and millions of her treasure.

If anything has served to quench the first flames of a war that lately threatened us, and which half a century earlier would by this time have devastated half Europe, it was the united condemnation of that war by the voice of public opinion—an opinion, be it remembered, concerned far more with the impolicy than the wickedness of war; with the evils that result from it far more than the guilt which would promote it. This useful creed—a lawful creed so far as it goes—is amazingly strengthened by every increase of commercial intercourse between ourselves and other countries.

Our neighbours have recently borrowed from us an institution to which English agriculturists are daily and increasingly acknowledging their obligation. The French *Concours* will soon become as influential and as useful as our own meetings and shows. Another and still more important improvement is now in contemplation. *La Liberté commerciale* is befriended by Imperial favour. It remains to be seen whether it will win as complete a victory as Free-trade obtained in these Islands some thirteen years ago. I propose to consider each of these topics in full. But, previously, we will take a retrospective view of French Agriculture from the period of the first Revolution.

At the commencement of the Revolution two arbitrary laws greatly affecting the land were passed—such laws as are enacted only in times of great excitement. The property of the Church and the possessions of the Noblesse were confiscated for the good of the nation. The ecclesiastical revenues were not very large. They were valued by the Bishop of Autun, in 1789, at seventy million francs per annum (2,800,000*l.*) The nobility possessed nominally a quarter of the soil, "but so neglected, so badly looked-after, so burdened with debts of all kinds, that the net revenue was almost nothing." A few *Grands-Seigneurs* lived splendidly at Versailles, but the large majority of the territorial magnates "vegetated wretchedly on small manors, which often did not bring in more than 2000 or 3000 francs of rent" (80*l.* to 120*l.*)† The grants of indemnity in 1825 prove exactly the value of these estates. While some few of the returned *émigrés* received 40,000*l.*, by far the greater number obtained about

* Carlyle's 'History of the French Revolution,' Part i. c. 2.

† 'Revue des Deux Mondes,' Novembre, 1858, p. 450.

2000*l.* To some few claimants, though these doubtless were peasants, 4*l.* and 2*l.* were awarded.* But the land of the millionaires was even worse cultivated than that of the peasants. Wherever you come across the estates of a great lord, the land is sure to be uncultivated, said Arthur Young. He noticed, especially, the domains of the two largest proprietors in France, and these were fallows or deserts. "If I were, just for a few days, the sole ruler in France, I would make these lords swing," was the angry exclamation of the English traveller. The French rulers behaved more leniently than this, yet still with sufficient severity. Instead of selling a portion of these encumbered estates for the liquidation of the heavy debts of their proprietors, they confiscated the whole to the national fund, notwithstanding that the Revolution numbered supporters among the noblesse as illustrious as Lafayette, La Rochefoucauld-Liancourt, Lally-Tolendal, and Mirabeau.

Where the landlords are paupers, it is difficult to say into what depths of misery the tenants will fall. Several years before the Reign of Terror, French statesmen had mourned over the sad condition of their country. The celebrated Vauban wrote nearly a century before the Revolution:—"The mass of pauperism is now extremely great. . . . Almost a tenth of the population is as poor as beggars, and actually begs. Of the remaining nine-tenths five are unable to give alms, because they themselves are reduced to the same plight; and of the other four-tenths three-tenths are in a very miserable condition." Arthur Young, who travelled through France during the years 1787-88-89, adds his testimony to the general poverty of the agricultural classes. "It reminded me," he says emphatically, "of the miseries of Ireland." There is, however, one bright light in this gloomy picture. Passing through the districts where small properties abounded, Young noted a wonderful contrast to the rest of the country. Of the neighbourhood of Dunkirk he remarks:—"The magic of property turns sand into gold." And again, "Much watering at St. Lawrence; the scenery very interesting to a farmer. An activity has been here that has swept away all difficulties before it, and clothed the very rocks with verdure. It would be a disgrace to common sense to ask the cause; the enjoyment of property must have done it."

The immediate effect of the Revolutionary changes on agriculture was undoubtedly injurious. Although the land was now free from all those taxes and imposts which so impoverished the occu-

* The Minister of Finance reckoned the number of acquirers of ecclesiastical property at 666,000; of property belonging to the old corporations, 440,000; and the sales of communal property at 110,000.

piers of it, there was no improvement in the tillage. The anarchy of the cities had spread to the villages. Bands of robbers scattered themselves through the provinces. Their hatred was manifested not against the feudal rights of the nobles, but against property itself, though now no longer in the hands of a privileged class. "War to the castle, peace to the cottage," was the cry. But the flames which destroyed the one did not spare the other. The spoilers, in their haste to devastate the parterres and preserves, trampled down the fields ready for the harvest. "The inevitable consequences of these disorders were soon manifested. Food, already scarce, became still more so, and the first effect of agricultural freedom was a famine."*

The ten years that followed this disastrous 1789 were even more gloomy. Tyrannical laws arbitrarily fixing the prices of food were the not-surprising result of a government which was overawed by a famishing population. During the Consulate the prospect began to brighten. Chaptal, during his brief term of office, did what he could for agriculture. But with the wars of the Empire another grave evil arose. The labouring class was decimated by repeated conscriptions. The country was drained of its revenues. Want of capital and scarcity of hands were the double difficulty against which the farmer had to strive. Absurd regulations contending with the natural laws of commerce hampered him still more, forbidding him to sell wheat at more than a certain maximum price, and interfering with the management of his live-stock; so that it is a matter of wonder to find that the cultivation of the soil was not completely abandoned. We must not, however, put down everything to the side of loss. A large amount of gain was to be derived from the *Code Napoléon*, which will confer more lasting glory on the memory of its author than a hundred such victories as Marengo and Austerlitz. The codification of the laws affected the value of real property to an amazing degree. Security and cheapness in obtaining a title increase the value of property not only directly, but also indirectly by promoting an increase in the number of purchasers. Napoleon's great measure, therefore, supplemented and extended the laws of the Republic which provided for the subdivision and equal inheritance of the land. From the period of the first to the second empire agriculture has progressed,—slowly, indeed, judged by an English standard of advance,—yet surely, as will be seen from the subjoined statistics, which I borrow from M. de Lavergne. This improvement is manifested in two ways: by the amount of land under cultivation, and by

* 'Revue des Deux Mondes' Novembre, 1858, p. 455.

the quantity of produce per acre obtained from that land. Accordingly we learn from Arthur Young that in 1789 the soil of France was thus divided :—

Arable land	26,500,000 hectares, or	66,250,000 acres.
Vineyards	1,500,000 ..	3,750,000 ..
Woods	9,000,000 ..	22,500,000 ..
Pasture and Meadow ..	3,000,000 ..	7,500,000 ..
Waste lands	10,000,000 ..	25,000,000 ..
Total	50,000,000 ..	125,000,000 ..

At the present time the distribution is as follows :—*

Arable land	28,000,000 hectares, or	70,000,000 acres.
Vineyards	2,000,000 ..	5,000,000 ..
Woods	8,000,000 ..	20,000,000 ..
Pasture and Meadow ..	4,000,000 ..	10,000,000 ..
Waste lands	8,000,000 ..	20,000,000 ..
Total	50,000,000 ..	125,000,000 ..

The contrast is not great when we remember that the two periods here taken are seventy years apart. The reclamation of 1,000,000 acres of waste land and 3,000,000 acres of wood is a small matter when compared to what has been done in our own

* According to the last survey, the total superficies of territory is 52,305,744 hectares, 32 ares, as under :—

	Hectares.	Ares.
Estates, not built on, taxable	49,285,292	52
„ built on	245,043	45
Ground not taxable, roads, streets, rivers, lakes, &c. ..	2,775,408	35
Total	52,305,744	32

The taxable estates, not built on, are made up of the following :—

Principal Cultures.

	Hectares.	Ares.
Lands subject to tillage	25,581,658	70
Meadows	5,159,226	26
Vineyards	2,090,533	58
Woods	7,702,435	16

Various Lands.

Orchards, gardens, nurseries	628,235	35
Osieries, withy-beds, &c.	64,716	51
Quarries and mines	4,175	74
Lakes, water-courses, reservoirs, &c.	17,400	94
Canals	12,272	98
Heaths, turf-beds, marshes, rocks, uncultivated mountains, and waste lands	7,171,203	16
Ponds	178,723	28
Olive, almond, and mulberry plantations	110,724	60
Chesnut plots	563,986	26
Total	49,285,292	52

country. A more favourable result will be obtained from the following statistics. There were—

	In 1789.	In 1848.
Fallows	10,000,000 hectares.	5,000,000 hectares.
Wheat	4,000,000 ..	6,000,000 ..
Rye and other grains	7,000,000 ..	6,000,000 ..
Oats	2,000,000 ..	3,000,000 ..
Artificial grasses ..	1,000,000 ..	3,000,000 ..
Roots	100,000 ..	2,000,000 ..
Various	2,400,000 ..	3,000,000 ..
Total	26,500,000 ..	28,000,000 ..

In these figures the difference in the quantity of roots is very markworthy: this difference points to a large increase in live-stock. Only a portion of the improvements that have been made can be shown by comparative statistics. Increased stores of manure follow increased root-crops; besides which, much has been effected in the way of drainage and irrigation with which the above figures are not debited.*

Before proceeding to fuller details, it will be interesting to describe very briefly the geographical and physical conditions of France. The fact that this country extends through nearly nine degrees of latitude, and that its extreme length is 664 miles, implies a very considerable variety of climate. Still further to augment these diversities, we find rich plains, watered and sheltered, alternating with lofty mountain-ranges of from 6000 to 13,000 feet in height. However, we may divide France with sufficient exactness into four zones. The northern embraces all that district north of a line drawn from the mouth of the Loire to the Meuse near Mezières. This we may term the wheat-growing zone. Below this line, and extending south as far as another line nearly parallel with the first, and running from the mouth of the Gironde to the Rhine at Colmar, we include the vineyard district. Still further south, and stretching down to a diagonal drawn from Bagneres in the Pyrenees to a few miles south of Grenoble, we pass through a country of which the maize is the characteristic product. Below this widest belt lies the narrowest and southernmost, comprehending the remainder of the kingdom, and noted for its olives, lemon-trees, and orange-groves.

The mean annual temperature of different parts of France has been thus estimated by Humboldt:—At Toulon 62° (Fahrenheit); at Marseilles, 59·5°; at Bordeaux, 56°; at Nantes, 55·2°; at Paris, 51·2°; at Dunquerque, 50·5°;—which figures give a far

* M. Barral estimates the total quantity of land that would be benefited by draining at 12 millions of hectares, = 30 millions of acres, or nearly a fourth of the whole surface.

greater range of temperature than is to be found in our own country. It appears that, although there are more rainy days in the north-western than in the south-eastern provinces, the actual depth of rain is greater in the latter. Thus, while the average in Isère is 32 inches, at Paris it is only 19. In the extreme south, the provinces of Languedoc and Provence are subject to a violent north wind called the *Mistral*, dry and cutting, whirling vast clouds of dust before it, and sorely trying man and beast. With the exception of the purely mountainous districts in the centre of France, the southern zone is the least fertile. True, the time of harvest is here three weeks in advance of that of the north; but the burning sun which ripens the grain seems to parch every other produce. A recent writer demurs to the common epithet of "gentle south." He says that it is rather "austere, grim, sombre. It never smiles; it is scathed and parched. There is no freshness or rurality in it. It does not seem the country, but a vast yard—shadeless, glaring, drear, and dry." One sees a "vast, rolling wilderness of clodded earth, browned and baked by the sun; here and there masses of red rock heaving themselves above the soil, like protruding ribs of the earth, and a vast coating of drowthy dust lying like snow upon the ground. * * Perhaps one or two distant figures, grey with dust, are labouring to break the clods with wooden hammers, but that is all. No cottages, no farmhouses, no hedges,—all one rolling sweep of iron-like, burnt-up, glaring land.*" Geologically, France may be considered as one extensive basin; the circumference and centre of which consist of primitive formations, the intermediate space being filled with those of a secondary and tertiary kind. Primitive rocks are found in the Alps, the Pyrenees, and the central or *Gallo-Francique* mountain-chain. The mountains in Auvergne are of volcanic origin, and cover an extent of 120 miles. In Ardèche we meet with groups of gigantic basaltic columns. The interval between the primitive formations of the centre and circumference of France is occupied almost entirely by secondary formations, chiefly calcareous or marly, composing hill-ranges, not steep but bare, with thin soil. It is on such land that the vines of Burgundy flourish to perfection. The tertiary formation is mostly calcareous. The "Paris Basin" is a remarkable instance of it, forming an irregular trapezium: the boundary of it passes through Orleans, Laon, Beauvais, and Chartres. A still larger tertiary district is found at the foot of the Pyrenees, including almost all the valleys of the Adour and Garonne. There are others in the valleys of the Loire, Rhine, and

* 'Claret and Olives: from the Garonne to the Rhone.' By A. B. Reach. London, 1853.

Allier. The most extensive alluvial district is that around the mouth of the Rhone. Here we find a vast extent of lagoon and marsh, and the low ground extends along the course of the river as high as Lyons. It is in this district, situated between the Rhone and the Saône, that the late disastrous floods overran a wide surface of country. The basins of the rivers are generally fertile, especially those of the Seine, the Loire, and the Garonne. The provinces of Maine, Anjou, Touraine, and Orleannois, all situated within the basin of the Loire, are among the richest in the kingdom.

It may be stated in a few words that the northern provinces of France, with the exception of Bretagne, are generally very fertile, and certainly the best cultivated. The midland provinces are in many cases mountainous, and therefore, while affording herbage for cattle, are but little tilled. The south-western provinces are mostly barren, especially Gascony and part of Guienne. Here the *Landes* form one of the wildest parts of France. Excepting here and there small patches of poor, ill-cultivated land, the whole country is a solitary desert, black with pine wood, or white with vast plains of shifting sand. Low, dreary swamps alternate with heath-covered hills. The sand-storms are most disastrous; the whole face of the country is changed by them in an incredibly short time. The shepherds in their daily work are seen walking about on stilts, at a pace of from five to seven miles an hour. Poitou, though not so utterly desolate as Gascony, is but little more fertile, and contrasts strongly with the vine-growing provinces of Champagne, Burgundy, and Guienne. The capabilities of the soil may be to some extent gathered from the following figures:—

	Hectares.
Mountainous	4,268,750
Heath-land	5,676,088
Rich soil	7,276,368
Calcareous	9,788,197
Gravelly	3,417,893
Stony	6,612,348
Sandy	5,921,377
Clayey	2,232,885
Marshy	284,454
Various	7,290,240

52,768,600*

It might not unnaturally be expected that in a paper treating of French agriculture some account should be given of the rotation of crops adopted in France. This information is, however, by no means easy to obtain. For in the first place, France being, as has been stated, a country of such physical diversity, facts

* These figures are somewhat too high according to the last *cadaastre*.

relating to one district would be inapplicable to another. The Norman grazier has scarcely anything in common with the shepherd of Auvergne. The root and cereal cropping of the northern provinces would form no guide to a proper appreciation of the vine and olive husbandry of the sub-Pyrenean regions. Nor is this all. France being for the most part a country of the *petite culture*, the owner of each little estate ranging from five to thirty acres pursues his own course of cultivation without regard to the three-fold or four-course systems that regulate the practice of the English farmer. Upon such small properties the spade is the chief implement; thus there is no room for the commercial enterprise that enters so largely into British agriculture, and we shall meet with few of the appliances and mechanical contrivances that we may find in any one county of England. It should be borne in mind, when attempting an estimate of French farming, that there is one crop occupying a very considerable portion of the soil—the beetroot—which is raised not chiefly as food for cattle, but mainly for the manufacture of sugar.* This plant and the potato, which is the favourite crop in miniature farms, cover a vast extent of ground.

One other point should be noticed before proceeding to details. The *métayer* system of rents is still common in France. There seems no reason why political economists should contend so fiercely on this matter. Viewed correctly, the *métayage* is nothing more than a produce rent, which is by no means unknown in our own country, and which, indeed, is the very system that some of our most eminent northern agriculturists are desirous to extend. The landlord finds capital, or in France that which is equivalent to capital,—seeds, tools, and stock; he receives in return a rent which is paid wholly in produce, generally amounting to one-half of what is raised from the farm. The discrepancy in the reports that have been made of the working of the *métairies* is due to the difference in the date of these reports. But, upon consideration, it is clear that to quote Arthur Young as an adverse witness is unfair. He wrote at a time when the landlords had no capital, and when, therefore, the half of the produce was a heavy rent for the tenant to pay; a rent, in fact, which he had no means of paying. At the present time the state of agriculture is immensely altered. Certainly, there can no longer be such an unfavourable exemplification of the system

* I presume that most of my readers, when making their first continental tour, have been as much alarmed as myself at the formidable size of the lumps of sugar which are served up with that most delicious of beverages, the *café au lait*. Experience soon corrects our modest attacks upon the sugar-basin. We speedily find that the *garçon* has not been at all too prodigal in his allowance. One experiment is quite sufficient to prove that French sugar made from beetroot is very different to the sugar of the West Indian sugar-cane.

as exhibited previously to the first Revolution. That there is nothing radically wrong in it is proved by the extraordinary prosperity of the peasantry in Tuscany and those other Italian states where the *métayage* prevails.*

As to wages, those of course vary with different localities. The average in France is from 13*d.* to 15*d.* a day; a rate which to a great degree explains the migration of population from the villages to the towns, of which I shall presently speak.

Reference has been made to the *Concours Agricoles*, which take the place of the meetings of our agricultural societies. As yet only one meeting of the importance of our Salisbury and Chester gatherings has been holden. This, as is well known, took place at Paris in 1855. There is some probability that the *Exposition* will be repeated on the same grand scale during the present year. In the mean time the provincial societies have rapidly extended themselves. During 1859 there will be at least twelve *concours*. There is still occasion for multiplying them, in order to spare the farmer the trouble of travelling some three hundred miles. The meetings in the west, north, north-west, and north-east provinces have been more successful than those of the other districts, just because in them agriculture has made far more rapid progress. The meetings of the southern and eastern districts have an interest of their own, inasmuch as they have been holden amidst all the difficulties and discouragements that inevitably arise where the cultivation of the soil is in a backward condition.

There is no lack of prizes at these exhibitions. The Minister of Agriculture and Commerce alone has offered a premium of 8000 francs (320*l.*) to that competitor, in *each* of the districts where *concours* are holden, who shall be adjudged to have farmed with the greatest success. The liberality of the premium testifies to the interest which the Government takes in agricul-

* Whatever evidence of prosperity the peasantry may show on some parts of the Continent under the *métayer* system, it belongs to a stage in society which we have passed in England. The essential feature in the *métayer* system is, that the owner of the soil provides the capital for its cultivation; he also takes his rent in kind, and becomes *pro tanto* the salesman and cornfactor. That which among other causes tends to place English agriculture at so high a point is, that the English farmer is a man of independent capital; and that in various forms capital made in trade finds its way into the improvement of farm-operations. The old system of taking the rent in kind has been superseded because the tenantry have become, in a mercantile sense, responsible men. An indirect result of the relation of landlord and tenant in England is, that while the landlord has every inducement to improve his property and take an interest in a thriving tenantry, he is relieved from petty details, and enabled to devote his time to the public service. The *métayer* system, or any other continental system, so far as we know, implies conditions at variance with the arrangements of property, independent enterprise, and self-government, to which England owes at once her stability and her progress.—Ed.

ture; still, at the same time, it is very questionable how far the merit of the rival candidates can be truly determined. To select the best bull, the most perfect sheep or pig, is comparatively an easy matter, inasmuch as the standard is to a certain degree fixed. But when we have to decide upon the skill with which the farmer has carried on his *exploitation*, the conditions are so various, so complex, that to arbitrate satisfactorily and fairly is almost impossible. We should have no difficulty in recognising a perfect farm. But where shall we meet with such? Our duty is to discriminate between different kinds, not degrees only, of imperfection—to balance between deficiencies of live stock and deficiencies in cereals—between defects in breed and fallings short in produce,—and many other matters that are not comparable. There is also a farther difficulty. In proportion as the farmer lays out capital, and introduces a commercial element into his operations, will he be the less ready to enter into details of the amount of his investments and returns. The manufacturer and the merchant would scarcely be induced by the most lordly present to give to the world an exact state of their affairs. And thus we find that in those very districts of France where agriculture is carried on most scientifically and most successfully—where the farmers are most wealthy and independent—there are the fewest competitors for the ministerial prize.*

To revert to the Exposition of 1855, we learn from M. de Lavergne in his work on Agriculture and Population, reprinted from the '*Revue des Deux Mondes*,' that 1500 head of live-stock were collected underneath the tents on the Champ de Mars. Of these one-third were from abroad. Eighty thousand visitors entered these tents in three days, notwithstanding that payment was demanded at the doors—a very unusual circumstance in French exhibitions. Of the 500 cattle exhibited, half were foreign. The short-horns of Durham found most favour with the judges. This race is spreading rapidly in France, as is proved by the fact, that of the 250 French beasts 50 were descended from the Durham. Yet, while well adapted for the north-west provinces, where cattle are rarely put to labour, the short-horns are totally unsuited for the southern departments, where most of the heavy farm-work is performed by beasts. The Ayrshire cows rank high in France as milkers. Of the thirty examples present nearly the whole were born in France,

* This is in accordance with the natural course of circumstances, and parallel to what has happened amongst ourselves. In the infancy of agricultural societies in remote districts prizes have been commonly given to the "best-managed farm," which, as the farming of the district improves, have been generally discontinued; the leading farmers withdrawing from the competition and taking an active part in more extensive measures of agricultural improvement.—Ed.

although it is only about five years since this kind was first introduced into the country. Among the indigenous races the Norman takes the lead both for the butcher and for the dairy. It is from the Norman beast that Paris derives its supply of butter and meat, and a great portion of its 120,000,000 quarts of milk yearly. Normandy produces annually about 100,000 fat oxen, half of which find their way to the Parisian markets. Besides which these five departments support 500,000 cows; and the total number of cattle in this one province alone is about a million, or a tenth part of the whole French supply. Yet, though comparatively large, this number gives only one to every three hectares ($7\frac{1}{2}$ acres), which is the same proportion that we find for the whole of England. In French Flanders we do not meet with the same conditions as in Normandy. The former is far more densely populated, and finds its market within its own boundaries. The Flanders cow is almost perfect, and will readily yield 3000 quarts of milk per annum. French Flanders is more productive than any part of England: in no country of the world shall we find so many cattle, or an agriculture so intensive. The five departments of Flanders and ancient Picardy contain 600,000 cows. In the arrondissement of Lille we find one for every hectare, each cow supporting a family; and in this district we find the known maximum of population. In the peninsula of Brittany we meet with a supply of cattle nearly as large; of smaller size indeed, but of great merit. The Brittany cow will feed where other cattle would starve; she gives the very best kind of butter and an abundant supply of milk. The grazier finds the oxen fatten rapidly, and yield a first-class meat; the breeder obtains an infinite variety of crosses. South of Brittany, in Vendée, we meet with two races of cattle known by the names of Chollet and Parthenay. The former is well adapted for fattening.

"If we were to draw a straight line from the sea at the mouth of the Charente, to the source of the Oise on the Belgian frontier, passing by Paris, we should include a kind of peninsula, Brittany forming the extreme point; and which contains, with that province, La Vendée, Flanders, Picardy, Normandy, Maine, Anjou, the Isle of France: that is, about a twentieth of the departments, or a quarter of the whole French territory. Here we should find collected four-tenths of the cattle, or four million head, divided among the three great families of Norman, Breton, and Flemish, with their branches the Mançelle and the Vendéan; thither come to fatten in a series of migrations a large number of other kinds of cattle; there are concentrated nearly all the foreign importations and nearly all the attempts at cross-breeds; from thence, in short, are obtained half of the milk and meat of France." *

The other races of cattle are employed in labour, and are

* De Lavergne, '*L'Agriculture et la Population*,' pp. 25, 26.

of an inferior description. The twenty departments that form the north-east angle are the next richest after the north-west, and contain about two million head of cattle. On the other hand, the centre of France is one of the poorest districts in Europe. Constituting nearly a fourth of the soil, one-third of this portion is totally uncultivated, and the remaining two-thirds are little better than wastes, so that the purchase-money of 8*l.* per acre is a high price. The population is scanty, being at the rate of one person to five acres, and is composed of small proprietors living in a state of abject misery.

“Whence comes this sad condition of a quarter of France, whilst in English regions precisely similar, such as the counties of Devon, Nottingham, Derby, the lowlands of Scotland, and even in France the Cotentin and a part of Brittany, are in the most flourishing condition? From many causes, too long to enumerate now,—chiefly the long-standing deficiency of communications. The centre has not, like the north and the south, a magnificent development of coasts, large rivers, and vast plains; situated far from the sea it does not possess a navigable river, and the greater part of it is cut up by impracticable mountains. Men have treated it even worse than nature: while the rest of the country is covered with roads, canals, railroads, this district has remained neglected; it has paid for centuries taxes from which it derives no profit; each of its valleys has remained even to our own time a world apart, whither nothing from without can come, and which has never heard of the Central Government except when it had to pay tribute.”*

Its race of cattle has saved this district from utter ruin. On the volcanic mountains, which rise from 6000 to 7000 feet above the sea, the far-famed race of Auvergne contrive to feed. Auvergne nourishes cows chiefly, from which are obtained the cheese well known in France. The fourth and south region contains fewer cattle than any other. Here the system of culture is altogether different: animal produce gives way to vegetable. In the land of vines and olives—a land where the temperature is necessarily far higher—less animal food is needed. Nor is the country adapted for producing it; for while underneath the slopes of the Pyrenees and in the valley of the Garonne there are rich and well-watered pasture-lands, the larger portion of the south of France is very dry.

The superiority of English over French sheep is even more marked. England supports three times as many as France, and these are of a higher average value. The Exposition at Paris contained about 600 rams and ewes, a quarter of which were foreign. Until lately the sheep-farmer found it would pay him better to look after the wool than the meat. It is only very recently that the demand for mutton has increased to such an extent as to make the carcase more valuable than the fleece. This circumstance has necessarily affected the management of the flocks.

* De Lavergne, ‘*L’Agriculture et la Population*,’ p. 27.

Hence we find that France cannot compete with our Dishleys, South-downs, and Cotswolds. On the other hand the Merinos in France rank highest of their kind. The race of Rambouillet is especially famous for its meat, as well as for the fineness of its wool. Indeed, while for size and shape the French breeds are far inferior to our own, French mutton is generally superior, and would be as good as our favourite Welsh joint. One article of French produce must not be forgotten here—cheese made from sheep's milk, which, says M. de Lavergne, deserves to be better known.

In the porcine tribe England again takes precedence of her neighbour. A large importation of foreign breeds would be very desirable for a country where the flesh, under various forms, constitutes a third of the national food.

In France goats form a larger portion of the live-stock than with us. The gross annual produce of the goat of Mont d'Or, in the neighbourhood of Lyons, is reckoned at 125 francs (*5l.*) per annum: no extravagant estimate when it is remembered that this animal yields 600 quarts of milk each year, and that the cheese made from goat's-milk is a very favourite article of diet.

The French poultry is as much superior to the English as our pigs are to those of France. The care which we have bestowed upon the one, our neighbours have given to the other. Nor is this trouble without its reward. The egg-produce alone is reckoned in France at 8,000,000*l.* per annum. M. de Lavergne recommends us to obtain our breeds from his country, instead of sending to India, China, and Malay.

Having thus briefly reviewed the live-stock of France, let us look for a few minutes at her vegetable produce: and here the first thing that will strike us is the great variety of French produce. Accustomed to the ordinary routine of cereals and roots, we are astonished when we come to view the French oils, vines, textile plants, sugar-yielding plants, and a host of others. The next point that will arrest our notice is, that while in our own country all other crops are considered subsidiary to and preparatory for wheat, in France the beetroot takes the lead.* In the department of Pas de Calais there is, wrote M. de Lavergne four years ago, an establishment where 2500 acres are cultivated with beetroot, which nourished 1000 head of cattle, and thus derived sufficient manure for obtaining 10,000 hectolitres of wheat.† In another depart-

* In 1840, 19,808 hectares were devoted to this crop; in 1855, 67,452 hectares—an increase of 350 per cent. in fifteen years.

† The *hectolitre* is equal to 2·838 bushels. It may interest some of my readers to know the principle upon which the French system of weights and measures is based. The *mètre* is the foundation of all, and is the 10-millionth part of the distance between the equator and the pole; it is equal to 3·371 English feet. The *are* equals 100 square *mètres*: the *hectare* is 100 *ares*. The *decimètre* is the 10th part

ment a society had been formed with a capital of 32,000*l.*, which devoted its exertions to the cultivation of 1250 acres of beetroot, which were used in the manufacture of sugar and alcohol, and the fattening of cattle. This society paid its shareholders at the rate of 15 per cent. on their money. In this prosperity the State also shares by means of its impost on sugar. However, this success must not be regarded as invariable: the failure of the vine-crop had a large influence upon the sale of alcohol derived from the mangold. Moreover, in case of any alteration in the price of sugar, the profit would be largely diminished. We may, therefore, still advocate the English principle which makes the production of bread and meat the chief end of agriculture.

Besides the beetroot we must mention other field crops, such as tobacco, flax, colza, madder, all of them more or less exhausting to the soil, but all of which are grown in France to a considerable extent.

With regard to wheat—the most important crop of all, only two of the seven species known to botanists are found in that country—the *Triticum sativum*, and the *Triticum turgidum*. The proportion of land devoted to this crop has slowly increased from 4,753,000 hectares, in 1821, to 6,488,000 in 1856. In default of more recent statistics, the following will be interesting. There were :—

	In 1789.	In 1815.	In 1848.
	Hectolitres.	Hectolitres.	Hectolitres.
Wheat	34,000,000	44,000,000	70,040,000
Rye and other grains	46,000,000	44,000,000	40,000,000
Potatoes	2,000,000	20,000,000	100,000,000

So that while the amount of land in wheat has during the thirty-three years 1815-1848 increased by about one-fourth, the produce has augmented three-fifths. The reader will not fail to be struck with the decline in the cultivation of rye—a crop that marks a poor soil or a primitive cultivation, and the enormous increase in the potato crop.

We have seen that the woods occupy nearly a sixth of the soil. A few words with regard to these will therefore be not uninteresting. There appear to be two errors in the present system of French arboriculture. The first consists in the want of care that is bestowed upon the planting and the preservation of trees. Concerning the second, M. de Lavergne writes :—

of a *mètre*; and the *litre* is a cubic *decimètre*, or 0.264 of a gallon. The Greek numerals mark the ascending scale or multiples of the *mètre*, *litre*, as thus: *kilomètre*, 1000 *mètres*; *hectolitre*, 100 *litres*. The Latin numerals denote fractions; so that *millimètre*, *centilitre*, would be respectively the 1000th part of a *mètre*, and the 100th part of a *litre*. We may well envy our neighbours their simple and scientific scheme.

"We see in our forests only firewood, and neglect, I know not why, their other products. In the mean time a vast number of trades employ wood as their chief article. Ship-building, timber-work, joinery, coach-building, cabinet-making, require every year enormous quantities. Our first and our last dwelling—the cradle which receives us at our birth, the coffin in which our lifeless corpse is laid—are of wood. . . . It has been said that the civilization of a people is measured by the quantity of iron which it uses: the same might be said of wood."*

One author reckons that in France wood to the amount of 650,000,000 cubic feet for firewood, and 390,000,000 cubic feet for the navy and industrial purposes, is used annually. In England, the total annual amount of the wood employed, of which scarcely any is for domestic use, is 1,170,000,000 cubic feet. To supply this enormous demand, the importations in both countries have increased threefold since the peace of 1815. England alone imports 975,000,000 cubic feet. France, relying more upon her own resources, does not import a quarter of this amount. Yet even this is by far too much when it is remembered that a tenth of the whole soil is covered by woods and plantations. At present the *Bois* do not yield nearly the value that should be derived from them. This deficiency is caused by the too great though natural partiality for the quick returns obtained from copses over the tardy revenues brought in by the forests. The traveller through France cannot fail to notice the great dearth of timber-trees. He sees nothing but plantations of tall poles, from which the boughs have been lopped off. Certainly he must journey far out of the ordinary routes to meet with such a giant oak as '*Le Chêne des Partisans*,' which is 110 feet high, 84 feet in girth, and 800 years old.

I cannot do more than allude to the wines of France. In fact, as these are manufactured articles, any lengthened notice of them in a paper professing to treat of the natural productions of the country would be out of place. Suffice it to say, that a very considerable portion of national wealth is invested in the vineyards of Bordeaux and Champagne; and that the recent blight has been very disastrous to the landlords and tenants in the vine-growing provinces.

Let us pass now from the more purely agricultural subjects that we have been considering to those which are connected with the political economy of the country; but which, though indirectly, largely-influence the agriculture of France.

It is now just about a hundred years since Dr. Quesnay, a writer in the French *Encyclopédie*, pointed out that it was not merely the quality of the harvest which regulated the price of corn, but freedom or restriction of commerce. We have no right

* '*L'Agriculture et la Population*,' p. 104.

to express any great degree of surprise that the Doctor's countrymen have not yet learnt the lesson which he taught them, when we remember that not twenty years have passed since we were subjected to the same laws to which our neighbours still submit, and that only very recently the question of Protection has been answered once and for ever. In France this important subject is still unsettled; although the inquiries sent by the Emperor to various agriculturists in England, as to the effect of Free Trade in this country, point to a speedy and satisfactory solution of the problem.

To say that *La Liberté Commerciale* obtains as much notice in France as Free Trade gained in the days when Cobden and Bright were all-powerful, would be incorrect. Wheat is the most important produce of a country. But when that country exports instead of imports,* the duty on wheat is of comparatively little consequence. But there are other productions which are subject to a similar impost, and which feel the effect thereof in a much greater degree. It is obvious that in a country where the geographical area is as large as that of France, and where there is such an extensive sea-board, it must often be far more to the advantage of the agriculturist to export his produce out of the country, than to send it from one end of the kingdom to the other. So, likewise, with regard to those products in which a district is deficient. These will frequently be far more readily obtained from foreign than from home sources. The farmer in the neighbourhood of Marseilles will find the expense of transporting cattle or grain from Normandy a considerable proportion in the amount he has to pay. In all probability freight would be less costly than land carriage, and he would, therefore, prefer to make use of the port of Marseilles, than of the hundreds of leagues of railway which connect him with the North-western provinces.

But as I am not writing for French readers it is not necessary to pursue this subject. Suffice it to say, that M. de Lavergne, the chief of French agriculturists and economists, does not cease to enforce the principle of *La Liberté Commerciale* by all the argumentative power, felicity of illustration, and fullness of statistics which have ever marked his writings. The time is probably not far distant when he will see, and rejoice in, the result of his persevering labours.

It is important we should examine the condition of the French population. According to Malthus, the actual power of multiplication in the human race is such, that if not checked by a deficiency of food the population would double in twenty-five years.

* During the past year England received more wheat from France than from any other country, except the United States of America.

Therefore, since, as we have stated, such an immense proportion of the French people are engaged in agriculture, the state of the population, and the politico-economical condition of the people generally, are matters of grave importance.

In the year 1790 the population of France, including the recently-added department of Vaucluse, was 26,500,000. In 1815 it had increased to 29,500,000, there being a difference of 3,000,000 in twenty-five years. In 1846 the census gave a result of 35,400,000 souls, or an increase of nearly 6,000,000 in thirty-one years. The succeeding ten years added only 600,000 to the population. So that during the period of the Revolution and the wars of the empire the average yearly increase was 120,000 inhabitants; during the period of the Restoration and Constitutional Monarchy this average was 200,000; but during the decade 1846-56 it fell to 60,000. The value of these figures will be better understood when compared with the census returns of other countries. In Belgium the increase of population from 1851 to 1855 was such, that if France had progressed in the same proportion she would have gained 1,500,000 souls. Compared with Prussia or Holland this increase should have been 2,000,000; and while in England the annual excess of births over deaths is about 360,000, in France the *deaths exceeded the births* in the years 1854, 1855.* In fifty-four departments the population has receded between 1851-6. In thirty-two only has it increased. In many departments the diminution has been as much as 5 per cent.; in one—Haute-Saône—it has been more than 10 per cent. On the other hand, the increase in some departments has been equally great. In that of the Seine this augmentation has reached the enormous proportion of 25 per cent. This advance is the more remarkable, inasmuch as it is almost entirely confined to the two Parisian faubourgs, Saint-Antoine and Saint-Jacques, where the inhabitants have nearly doubled; Lyons, Marseilles, Bordeaux, Nantes, Saint-Etienne, and several other principal towns, have likewise largely increased; and since the total population is nearly stationary, necessarily at the expense of the rural districts. These facts remarkably illustrate the difference between the French and the English national characters. Land in France being infinitely subdivided, is not the exclusive possession of the "Upper Ten Thousand." When every day-labourer owns his hectare or two of land the possession of two thousand hectares is no test of aristocratic exclusiveness. The superiority of class over class is indicated not by multiples of the same figure, but by entirely different factors. The poor man in England rarely becomes lord of real property, however small,

* I have not been able to obtain later statistics.

except his share in the churchyard ground. Therefore the rich man prides himself upon his broad acres lying snugly within the ring-fence. The poor man in France is master of a little estate which he inherited from his father, and which he will leave to his son. So the French noble turns his back upon rye-fields and vineyards, and sumptuously furnishes the hotel that lies within sight of the Tuilleries. Montaigne has left few imitators; for his successors, not having the genius of a Montaigne, would soon perish of ennui if secluded from the brilliancy of the Capital.

The centripetal character of the French people is fraught with important political consequences. The moral and civil well-being suffer no less than the physical health amid dense populations; and when we remember how peculiarly prone the French people is to social fevers, this converging tendency cannot be viewed without apprehension. "The masses sleep to-day," says M. de Lavergne, "but they may awaken at any moment, and we know how terrible that arousing is." In all cases union is strength. In none more so than where the "masses" are concerned. A thousand men well organised may bring about a revolution. Where the strength of hundreds of thousands is combined the momentum becomes very formidable and very unmanageable. The extremes of luxury are always found in a crowded community. Immorality follows hard upon luxury. The great French statistician, M. Legoyt, has lately shown in the *Journal des Economistes*, that an urban yields itself up far more readily than a rural population to hurtful lusts. The average of life is shorter, the number of marriages and of births is fewer, the proportion of illegitimate to legitimate children is larger, the total of still-born infants is higher, in towns than in villages, and in Paris than in other towns. It is a well-known fact that French families are much smaller than English, and that the rate of increase of population is much slower in France than in any other countries of Europe, except Sweden and Turkey. This fact would seem to point to a very laudable self-restraint, by which the Frenchman forbears to burden his country with an offspring which he has no means of bringing up. But this restraint is quite as selfish as it is prudent. Good morals, it may be feared, have but little to do with it. In that country, as well as in Sweden, the principles of Malthus are carried out, but not in the spirit of Malthus. Our much-abused economist advocated late marriages, but at the same time insisted upon continence and morality.

But notwithstanding these evils there are advantages to be derived from the migration of the rural population to the cities. It may be that the provinces, though thinly, are yet over peopled, while the towns, though crowded, will receive more inhabitants

without inconvenience. This was some years ago the condition of France. In 1851 the number of hands employed in agriculture was about forty to every 100 hectares, while in England it was only thirty, who derived double the produce from the same extent of land. Contemporary with this surplus of agricultural labour, there was a deficiency of markets to receive the agricultural produce. By reason of the changes that then took place both these evils were remedied at the same time and by the same event. Both the agricultural labourer and the mechanic obtain better wages, and both are directly or indirectly improved with regard to markets. This is stated in the past tense, since the change, at first gradual and progressive, is now changed into a violent revolution. By the cholera of 1854 and the war of 1855 a sudden and enormous reduction was made in the rural population. Whole villages became depopulated; the loss in the agricultural districts occurring chiefly amongst able-bodied adult males.

The farmer should certainly not reproach the manufacturer on account of any deficiency that may exist in the supply of agricultural labour. Manufactures in France have but begun to grow towards their fit and natural development. Mining enterprise is by no means excessive, and, indeed, owes its present vigour to the construction of railroads. And, as regards railroads themselves, France cannot be said to be overstocked. At the end of 1856 Great Britain and Ireland, Belgium and Germany, had 500 kilomètres of railway open for every million hectares of land; or sixty miles for every million acres, while in France there were but 117 kilomètres to the million hectares, or about fourteen miles to a million acres. France, therefore, possesses less than one-fourth of the railway accommodation of the three countries mentioned above.*

It is not to these causes that the provinces of France must attribute any unnatural drain of population. The war with Russia is one cause—the migration to the capital is another cause. The latter cannot but be regretted—

"Not," says M. de Lavergne, "that agglomerations in cities, when they happen naturally, are always bad. London has already twice as many inhabitants as Paris, and the influence of that great centre of production and of consumption upon all branches of English industry, and, above all, upon agriculture, is unmixedly good. But London is peopled by degrees, by its own innate powers, without any artificial excitement, which is by no means the case with Paris, especially since 1851. The concentration of public expenditure upon this point, which at that time was already excessive, has in the succeeding five years passed all bounds. We find from an official document, the *Compte Général de l'Administration des Finances*, that out of a total of 2,379,000,000 paid by the public treasury in 1855, the department of the

* During the past year, however, a large addition has been made to the length of railway.

Seine alone has absorbed 877 millions. In 1850, 497 millions were paid in the same department—a sum sufficiently large. If it is natural that the seat of government should be the theatre of exceptional expenses, it is but right that this privilege should have its limits.”

In twenty-eight departments where the population has decreased, the total of public expenditure was only 158 millions, or five and a-half millions for each. This difference is prodigious, and should be borne in mind.

Generally it may be stated, that the population in the provinces of the north and north-west has increased, and, with a few exceptions, according to the normal rate. In the eastern, central, and south-western provinces, the decrease has been about 350,000 souls, and this figure added to 450,000, which is the number representing the normal increase, makes a total deficiency of 800,000 souls. France, already one of the most-thinly populated countries of Europe,* bids fair to become in course of time an uninhabited waste when compared with the rest of the Continent, holding somewhat such a relation to it as the Highlands of Scotland bear to the county of Middlesex.

The dispute between the advocates of large and small farms is of long standing. The partisans on either side have contended with a vehemence that is rarely displayed except in questions of theology. The *petite culture* system has its supporters among the political economists and agricultural writers, but its opponents are made up of a sturdy phalanx of practical farmers. The Englishman, ever prone to give judgment against the theorizers, would in this case rule absolutely in favour of the *grande culture*, were it not that the class of agriculturists is notoriously conservative of old customs, and averse to all alterations, even though they should be improvements. The cautious judge will probably sum up in those words of wisdom consecrated by old and frequent use, “There is a great deal to be said on both sides.”

The special pleader for large farms urges us to contrast English with French agriculture. “Great Britain,” he avers, “is half a century in advance of her neighbour. Nowhere in the world will you see such farming as in England.” To this the counsel for small holdings rejoins, “Nowhere, certainly, will you see such expensive farming although in many countries you will find a far more productive agriculture. England has nothing to compare with the plains of Flanders, once barren sands, now the sands of Pactolus. In machinery and implements England stands undoubtedly foremost. But this was to be expected, since the mineral wealth of England is unparalleled. Give to France or Belgium the iron mines of Wales

* In 1851 Belgium contained 147 inhabitants to the hundred hectares; England, 130; Holland, 90; Germany, 80; Italy, 60; France only 67.

and they would soon shoot ahead, provided always *la liberté commerciale* were not withhelden."

The first speaker replies, "Though Normandy were one vast iron and coal field France could never compete with England in the completeness of her agricultural mechanics. For the French farmer does not possess a tithe of the capital which our magnates of the Royal Agricultural Society have sunk in their land. Without capital there can be no improvements." "Of course not," is the answer. "But this has nothing to do with the comparison between France and England. Rather it shows that any just comparison is impossible, and that, moreover, no other than the *petite culture* is possible in France. Besides, in that country human labour is far cheaper than throughout England; spite of the Dorsetshire seven shillings per week wages, we cannot afford to employ men in those operations which steam can accomplish. Neither Frenchman nor Belgian is nearly so valuable a person, and to supersede him by machinery would be penny-wise and pound-foolish. Lastly, I may remark that England has yet to learn from her neighbours how to make use of all the wealth that she so recklessly squanders, when she changes rivers into sewers."

From all these arguments we infer that certainly the small-farm system is the best for France; and that probably the large holdings are more suitable for our own country, though we would not speak too positively on that matter, when the sarcastic foreigner can point any day to our depopulated Highland county of Sutherland.

There can be no doubt that French agriculture has greatly improved since Arthur Young made his report. In the raising of crops, in the rearing of live stock, in the manufacture of implements, there has been a striking advance. Under Louis XV. the agricultural population receded: in 1813 it was triple that of 1788. During the years 1788 to 1813 there was an increase in the value of agricultural produce to the amount of 1,325,638,000 francs, or a yearly average of 53,000,000 francs; during the years 1813 to 1840 this increase was raised to 2,665,198,000 francs, or a yearly average increase of 100,000,000 francs.

The fact exhibited by the following figures is remarkable, and requires explanation:—

In the year 1700 there were,	}	11,607,800	hectares in cereal crops.
according to Vauban ..			
In the year 1764 there were,	}	13,506,554	" "
according to Mirabeau ..			
In the year 1788 there were,	}	14,402,300	" "
according to Lavoisier ..			
In the year 1813 there were,	}	16,706,000	" "
according to Chaptal ..			
In the year 1840, there were,	}	13,900,263	" "
according to 'Statistique de la France'			

This noteworthy reduction in cereal breadth is due to the introduction and active propagation of artificial grasses, of new vegetables, and of vines, which occupy together about 5,518,000 hectares. Beetroot especially has absorbed a large share of the land: it has gone on steadily encroaching from 19,808 hectares in 1841 to 67,452 in 1855. But, what is still more remarkable is, that a greater cereal produce is now obtained with the less acreage than was formerly derived from the greater. Thus, in 1813 the total quantity of corn harvested was 132,435,000 hectolitres, while in 1840, when the land occupied by corn was one-fifth less, the produce was 182,516,000, or five-thirteenths more than at the former period. This fact, taken in connexion with another, viz., that since 1700 the produce has increased at a greater ratio than the population, speaks well for the progress of agriculture. The steady advance in the value of real property (*propriété immobilière*) confirms this conclusion. In 1821 the total immovable property in the French kingdom was valued at 39,514,000,000 francs; in 1851 this value was raised to 83,744,000,000, and during the same period the net annual revenue had increased from 1,580,597,000 to 2,643,366,000.

France has many times suffered the horrors of famine. The historian reckons ten famines in the tenth century, twenty-six in the eleventh, two in the twelfth, four in the fourteenth, seven in the fifteenth, six in the sixteenth—a countless number during the reign of the *Grand Monarque*, when whole villages were depopulated. Now we no longer read of such dismal tales. Each little owner cultivates upon his miniature estate the crops that he will require for his own domestic use. Nevertheless, the French farmer is not so well situated as he might be. With a free trade there would be fewer irregularities in the price of grain. At the present time France is exporting to England alone 300 millions of hectolitres. But, should a year of dearth succeed a year of brisk importations, the poorer classes would suffer severely, since there can be no adjustment of prices where there is not unrestricted importation.

French agricultural machinery is as yet in its infancy. The '*petite culture*' system must necessarily retard its growth. Even the implements commonly used, the ploughs, the harrows, are somewhat rude when compared with the highly-wrought patterns of our great mechanico-agricultural firms.

In France the acres of land that have been drained must be counted by thousands, while in England they may be reckoned by millions. The costliness of this operation has confined it almost exclusively to the richer departments, such as Seine-et-Marne, l'Oise, l'Aisne, Seine-et-Oise, &c.

Irrigation is a far more important process on the Continent than in our own humid isle. The Andalusian often sows his wheat and reaps no harvest, for the dry hot spring has prevented germination. At other times his fields are drowned, and yet experience has not taught him that Nature may be tamed, and converted from a powerful foe to a most useful servant. The French peasant is well nigh as ignorant or indolent. He would do well to take a walk through the water-meadows of Devonshire.

But we must pass to the laws that affect the tenure of the land. We shall have space to consider two only:—the law by which the testator is limited in his power of bequest, and that by which the property of an intestate person is divided equally among his children. It might be thought that these laws of succession must necessarily tend to diminish the size of the properties. Mathematically it can be proved, that if a father leaves an estate to four sons, and each of these four sons leaves his own portion to his four sons, the proportion of land held by any member of the family in the third generation is only one-sixteenth part of the original estate; in other words, the grandfather's estate, originally 224 acres, when divided among the grandchildren, becomes sixteen small holdings of fourteen acres each. As a matter of fact, no such result takes place. For, in the first place, the average size of a French family is only 2·5 children, which represent but little more than the original parents—that is to say, the population does not increase in anything like the proportion supposed above. And next—all such mathematical computations leave out the combining element of marriage. The descendants intermarry freely, and this keeps together the estates in their original integrity. Moreover, supposing that any landowner should leave behind him a large number of children, each of whom would be entitled to an equal share in the estate, in such a case it would be most probably found that the younger children would sell their portion of inheritance to the elder. The latter would take upon himself the responsibilities of a landowner; the former would look for an occupation in trade, commerce, the army, or the learned professions. Nor are figures wanting to bear out this assertion.

In the present century two most important valuations of immoveable property have been made for the purposes of assessment. These valuations were instituted by virtue of two laws passed May 15, 1818, and August 7, 1850, and which were carried into effect in the years 1820 and 1851. The following are the results:—

In 1821 the number of parcels was 126,000,000, divided into—

	Parcels.
House property	6,577,000
Parcels belonging to houses	16,442,000
Land not built on, nor in connexion with buildings	102,981,000
Total	126,000,000

In 1851 the number of parcels was 127,000,000, viz. :—

	Parcels.
House property	7,578,000
Parcels belonging to houses	18,945,000
Land not built on, nor in connexion with buildings	100,477,000
Total	127,000,000

So that, during a period of thirty-one years, the whole increase is only one million, and this, be it remembered, not in the estates which, according to the mathematical theory, must have gone on subdividing, which, in fact, *have absolutely decreased*, but in house property, where it was to be expected that the increase would have been even greater than it is, when the augmentation of population is taken into account.

In addition to these statistics, it may be mentioned that the highly-taxed or large holdings have increased at a greater ratio than the small or lightly-taxed holdings. Nevertheless, although the evil results predicted have not followed from the succession laws in France, it must be admitted that any restrictions which prevent a testator from bequeathing his property at will to the next generation are to be deprecated. The old feudal laws, which enabled the landed proprietors of France to prevent the sale of their estates for several generations after their decease, were repealed in 1789, and justly so. But the legislature ran into the other extreme, by enacting the law of equal succession, which, notwithstanding M. de Lavergne's assertion that it is "the flesh and blood of France, and cannot be touched without danger," does certainly seem to Englishmen arbitrary and oppressive.*

We must not close this portion of our remarks without making some brief allusion to the system of registration which prevails alike in France and Belgium.

"Legal expenses," says Mr. Stuart Mill, "either those of actual litigation, or of the preparation of legal instruments; form no inconsiderable item in the annual expenditure of most persons of large landed property, and the saleable value of their land is

* Political doctors differ widely here. The Comte de Montalembert remarks, in his work 'On the Political Future of England,'—"It is still to be proved, whether the indefinite subdivision of inheritances and the dissolving effect of equal distribution are not the most efficacious instruments ever invented by despotism to crush all resistance, and pulverise all the collective or individual powers of a nation."

greatly impaired by the difficulty of giving to the buyer complete confidence in the title, independently of the legal expenses which accompany the transfer." * When, to all this expense, is added the element of uncertainty, there is good reason to complain of the laws which regulate the transfer of land in England. It is not at all improbable, under our present complicated system, that an unhappy purchaser may pay down a large sum of money for an estate which the receiver of the money has no power to sell. Such a case Mr. Kay mentions as having actually occurred within his own knowledge,† the estate purchased having been previously mortgaged without the knowledge of the purchaser, and the mortgagor having become bankrupt and left the country, the mortgagee claimed from the purchaser the money advanced upon the property.

In France no such accident can happen. Every change in the tenure of land must be registered, or the change is not legal. The register is free to inspection; it must then be the fault of the purchaser himself if he make a bad bargain, or buy that which cannot be sold.

In addition to the certainty is the brevity of the French transfer. A slip of paper is sufficient for all the purposes, for which our English multitudinous folios are professedly necessary, and which often fail in their object.

The following Table will be interesting, inasmuch as it illustrates the domestic condition of the French working-classes:—

In the year 1835 the census gave the number of houses in France as 6,748,151, arranged as follows:—

Houses with one opening (i. e. the door alone)	..	346,401
" two openings	..	1,817,328
" three "	..	1,320,937
" four "	..	834,061
" five "	..	583,028
" six, and more openings	..	1,846,398
Total number of houses		6,748,151

In 1846 the total houses were 7,462,545, divided as above, viz.:—

Houses with one opening	..	313,691
" two openings	..	1,805,422
" three "	..	1,433,642
" four "	..	996,348
" five "	..	692,685
" six and more openings	..	2,220,757
Total number of houses		7,462,545

* 'Principles of Political Economy,' vol. ii. p. 464, 3rd edition.

† 'Social Condition of the People,' vol. i. p. 51.

So that, in eleven years, the dwellings of France had increased above 700,000; but the houses with one and two openings—the hovels, they should rather be called—had considerably diminished. This, certainly, is a hopeful sign; and we may trust that the day is not far distant when France shall enjoy not only political liberty and a free press, but also a degree of social prosperity not hitherto attained.

IX.—*On Farm-Buildings for Small Farms.* By J. Y. STURGE, of Thornbury, Bristol, and T. W. P. ISAAC, 13, Northgate-street, Bath.*

THERE are probably few subjects on which practical men differ so widely as the one at present under inquiry. It is, we believe, admitted that the farm-buildings of the West of England are generally very old and of an inferior description. Erected piecemeal, with but little regard to the requirements of modern and improved practice, they frequently occasion considerable loss to the agriculturist. The value of time does not appear to be well understood, though it is evident that, where a large amount of labour is employed, a loss of time is equivalent to a loss of money.

If farm-buildings are so arranged as to increase labour in feeding cattle, carting manure, distributing straw, or preparing grain for market, these buildings are annually taking so many pounds sterling out of the farmer's pocket. Waste of manure, loss of the labourer's time, and disease amongst the cattle, are frequent results of the ill-arranged homesteads which so generally characterise the farming of this district.

Another source of loss arising from the bad arrangement of buildings does not at once strike the inquirer. Where cattle are not warmly housed, much flesh and fat-producing substance is expended in the sustenance of their natural heat: in other words, if cattle are kept in a healthy condition of warmth, they fatten with a less amount of food than when exposed to cold.

It is thus clear that, as the character of his buildings must exercise a most important influence on the balance-sheet of the farmer, they ought to be so arranged that the grain-crops may be prepared for market, and the live-stock provided for, with the greatest economy of time and labour. From these general prin-

* This paper is printed in the Journal, as the writers have taken some trouble to fulfil the conditions on which the prize was awarded. At the same time, it must be observed that a plan which provides—exclusive of the dwelling-house—for an expenditure of 1800*l.* on 300 acres, will hardly be deemed a satisfactory solution of the problem how to improve the buildings on small farms. The interest of the outlay, whether considered as a charge on the rental or an addition to the rent, being, at 7*l.* per cent., 126*l.*, or above 8*s.* per acre.—ED.

ciples, few will dissent; but there is a wide difference of opinion as to the best mode of putting them in practice. Much depends on climate, soil, and the system of cultivation pursued. The Exmoor farmer and the agriculturist of Taunton Dean would differ widely in their views: consequently, the opinions advanced in any essay on the subject should be received as suggestions, to be modified by special or local circumstances.

In the following pages, we have submitted plans for arable farms of about 300 acres; but, as in the West of England cider is frequently produced, the requisite buildings for its manufacture are added.

The two principal objects kept in view in the arrangement of the buildings are—

1st. To make convenient arrangements for threshing and preparing the grain-crops for market.

2nd. To provide, at the smallest cost, the best accommodation for the live-stock.

As the consideration of the best means of effecting these objects will be facilitated by a division of subjects, we propose to remark on—

1st. The choice of site.

2nd. The position and arrangement of the stackyard, barn, feeding-houses, stable, and implement-sheds.

3rd. The possible use of water-power.

1. THE CHOICE OF SITE.

The homestead should be as near to the centre of the farm* as circumstances will allow. "The site," says Mr. Ewart (*'Royal Agricultural Society's Journal,'* vol. xxv. page 206), "should be easy of access, dry, and elevated above, and removed from the immediate vicinity of marshes, lakes, and sluggish rivers, sheltered from prevailing winds by higher ground, and have a plentiful and never-failing supply of wholesome water."

It seldom happens, however, that these requirements can be combined, and the farmer's aim should be to choose a site possessing as many of these advantages as possible, and to supply the rest by artificial means. Thus the site may be rendered dry by underdraining, and shelter from prevailing winds may be obtained by a judicious arrangement of the buildings or by planting.

Perhaps, however, one of the most important points to be attended to is the supply of water. A constant stream running

* This may be a good general principle on an arable farm; but in the West of England it is of far more importance to place the homestead with reference to the meadows, to water, and to roads, and to the inclination of the surface.—*Ed.*

through the troughs saves trouble and ensures fresh water for the cattle at all times. This plan is adopted in several homesteads recently erected, and, among others, at those of Mrs. Kidner at Milverton, and Mr. Gregory at Long Sutton. When a natural stream cannot be obtained, the buildings may with advantage, in many cases, be so situated as to be supplied from a reservoir in which the drainage-water of the higher lands is collected. Shelter from prevailing winds should not be neglected; but, if the site appears suitable in other respects, this may in most cases be obtained by planting, or by a judicious arrangement of the buildings. A slope to the north or east, however, should be avoided.

It may be further remarked, that as a general rule the buildings of a farm should be concentrated * as much as possible. The home operations are by this arrangement conducted on one spot, the labour of supervision is lessened, and the hauling is materially reduced.

2. THE POSITION AND ARRANGEMENT OF THE STACKYARD, BARN, FEEDING-HOUSES, STABLES, IMPLEMENT-SHEDS, AND MANURE.

The Stackyard.—This should be immediately in the rear of the barn, and should contain all the corn and straw produced on the farm. When the ground will admit, it may be advisable to make the yard level with the first floor of the barn. This plan we have seen successfully applied in two or three cases. Again, supposing the ground to rise from the barn, an arrangement might be adopted similar to that at Mrs. Kidner's, by which the labour of stacking is lessened, the stacks being placed as it were on a flight of steps. The same end can be obtained on a level site by sinking the saddles below the ground, as adopted at Lord Portman's farm at West Lambrook.

In some large homesteads a tramway is laid between the stacks to facilitate the transport of the corn to the barn; but it is questionable whether the cost would not be too great to allow of its introduction on a farm of 300 acres.

The Barn.—The introduction of the steam-engine and the threshing-machine have greatly modified the farmer's wants as regards the housing of his grain. Now that threshing is rapidly performed by steam, water, or horse power, he no longer requires the large barn of former years. Grain also is found to keep much better in stacks upon proper stands in the yard than within the walls of the barn.

Mr. J. Hudson, of Castle Acre, in the 'Royal Agricultural

* As a general rule this may be true; but on stock farms, reaching into different combs or valleys, outlying cattle-yards are of great importance in winter.—Ed.

Society's Journal' (vol. xi. p. 284), remarks: "In this improving age it would be unwise to recommend the building of large and expensive barns, the more especially as steam-power is getting into such general use. I can speak practically upon this point." The barn should contain room for a large threshing-machine, with dressing-machine, chaff-engine, and corn-bruiser, and space to stow away about 100 bushels of wheat in sheaf, in order that spare time may be made use of in transporting such a quantity of corn from the stackyard to the barn as may be readily threshed whenever straw is wanted, or during wet weather. The straw-barn should be close to the barn, and as nearly as possible in the centre of the feeding-houses and yards.

Feeding-Houses.—The position and construction of these depend on the mode of feeding and housing adopted. Cattle are fattened by several methods: box-feeding, stall-feeding, and feeding in foldyards have respectively their advocates. Box-feeding has lately been much recommended. When the boxes are properly constructed and the comfort of the animals is duly attended to, this system is stated by its supporters to have advantages which none of the more common methods possess. It is asserted that cattle have all the warmth and shelter of the stall without its restraint, whilst there is economy of straw used for litter, and the manure—as shown by Dr. Voelcker in the columns of this Journal—is superior to that produced in open courts or byres.

The advantages of stall-feeding consist in the economy of house accommodation, the inexpensive nature of the fittings required, and, in common with box-feeding, the more equal distribution of the food.

With regard to the first point, it is found that, where bullocks are tied, a stall 8 feet in width is sufficient for two, while to allow room for an ox to turn, each box should be of dimensions not less than 8 feet by 12 feet. Foldyards with sheds is a common method of housing. When these are constructed so as to divide the cattle into small lots, the shedding being ample and comfortable and the climate not severe, cattle are found to do very well: they have also the advantage of being cheaper in construction. There are, however, drawbacks to this system of feeding. The manure is of inferior quality, being less consolidated and losing much of its valuable constituents by exposure to air and rain. Besides it frequently happens that two or more bullocks in each yard are prevented by the others from getting their proper share of food, and do not make satisfactory progress. Again, if the foldyard system be adopted, more yard room will be required, as additional provision in this respect must be made for the young cattle.

Board-feeding has also been advocated by Mr. Mechi and others, but it seems hardly reasonable to suppose that (feeding

and other conditions being equal) cattle kept on sparred boards will advance in the same proportion as those which have their comfort secured by well-littered beds, whether housed in boxes, stalls, or open sheds.

Whatever plan may be adopted, and on whatever scale the homesteads may be erected, it will always be better to provide several small yards than one or two large ones. Where young cattle are congregated in large numbers, the younger and weaker are sure to suffer, either from a deficiency of food or the attacks of the stronger.

The Stables and Implement Shed.—The stable should be placed as near as possible to the straw-barn and near to the road or entrance. Its arrangement is a matter of considerable importance. It should be well lighted, perfectly ventilated yet free from draughts, and properly drained: the health of the horse depends in a great measure upon attention to these particulars. Ventilation may be secured by building grating or air-brick into the wall at the head of each stall, a few inches above the floor; any direct draught from these gratings may easily be prevented by placing a little litter in front of each. The stable will also be rendered more airy if it is left open to the roof, instead of, as is the usual practice, filling up the space with a loft or tallet for hay.

Mr. Ewart recommends ('Royal Agricultural Society's Journal,' vol. ii. p. 338) that the windows should be fixed at the head of the stalls, instead of in the usual position at the foot. The advantage of this plan is that the light furnished is direct; reflected light being injurious to the eyes of the horse, and frequently causing blindness. Iron fittings are now very generally used, and appear to answer the purpose well.

The stalls should be either pitched or laid with brick on edge; the latter is by far the preferable mode where bricks can be obtained at a moderate price. From front to back of each stall there should be a slight fall, and a gutter running the whole length of the stables, with properly trapped sinks communicating with an underground drain.

The Implement Sheds.—These should be placed adjoining the stables and the carpenter's shop, and should be of sufficient extent to shelter the implements.

Manure.—On the management of manure Mr. Thompson, in the 'Royal Agricultural Society's Journal' (vol. ii. p. 191), remarks:—

"In ordinary farmyards manure is much injured by rain-water, and to obviate this it is suggested that covered depôts should be provided, where it may be deposited till wanted. The objection to covered manure-pits is the lightness of the manure, and its consequent tendency to heat itself dry with

very great loss of ammonia. It certainly may be watered from a pump or tank, but this would only increase the fermentation so long as the heap was light; and, to meet this difficulty, it has been suggested that it should frequently be carted over. It is certainly possible by carting, or some other mechanical means, to give sufficient solidity to prevent mischief; but when the trouble and inconvenience of carting over a partly decomposed heap, and also the probability of its being neglected in busy seasons, are taken into account, it will probably be found that, in the majority of cases, covered manure-pits would do more harm than good.

"Well spouted farmyards, in which the manure is allowed to accumulate through the winter, and trodden firm by being well stocked, heaps in the field well covered with soil, and loose boxes for cattle and farm-horses, will enable a farmer to keep his manure in first-rate condition; and the importance of these and other similar arrangements cannot be too often or too strongly insisted on."

"The more horse manure," says Mr. Hudson ('Royal Agricultural Society's Journal,' vol. ii. p. 287), "is mixed with that of the grazing cattle the better; and the small expense of carrying it into those yards daily will be amply repaid by the improvement in the quality of the manure."

The different yards should have a slight incline towards the centre, with drains leading to a covered tank, so as to prevent the waste of the liquid constituents of the manure.

Water and Steam-power.—On farms conducted according to modern practice, much of the work formerly done by the hand is performed by machinery, and therefore "power," either horse, water, or steam, is an absolute essential.

Horse-power is still frequently used, and possesses this one special advantage,—that in wet weather, or at any time when the horses would otherwise be standing idle, employment can be found for them in the home operations; they can also be put on for a short time at any spare interval. But on a farm of 300 acres the power would often be required at times when it would be exceedingly inconvenient to take the horses from other work, and, unless two or more were kept specially for this purpose, the use of either water or steam would be almost unavoidable.

There can be little question of the superiority of water-power, if it can be applied economically as to first cost, and without any serious disadvantage to the homesteads in other respects. It is available at all times, can be applied for a long day's threshing or turned on for half an hour's chaff-cutting with equal facility and no expense, and the machinery is simple, durable, and not likely to cost much in repairs. The farmer who, in arranging his homestead, should not avail himself of water-power—if within his reach, and unattended with any counterbalancing disadvantages—would undoubtedly compromise his own interest.

There are, however, few farms so situated that water-power can be applied without several drawbacks. The stream may be always insufficient in its volume, or fail during dry weather, thus involving the construction of large and costly reservoirs and dams;

or, supposing a sufficient stream to traverse the farm, it might not be available unless the homestead was erected in a low and marshy spot, which would be obviously unwise; or too far from the centre of the farm, which would, to a considerable extent, increase the hauling.

An able paper on the application of water-power, by Mr. Morshead of Liskeard, has appeared in the 'Journal of the Bath and West of England Agricultural Society,' (vol. iv.), from which the *formulæ* for calculating the motive force expressed in horse-power of any stream may be readily obtained. It will be sufficient here to state that to obtain a motive force equal to that of six horses (adopting Watt's standard of 33,000 lbs. raised one foot as the power of a horse), with an overshot wheel, with a fall of six feet, the stream must have a sectional area of about four feet, and discharge 666 cubic feet, or upwards of 4000 gallons, per minute. In general the employment of a lower power than that of six or seven horses is not advisable; if, therefore, the stream be of less volume than that above stated, or if it be liable to much diminution during the summer months, it becomes necessary to make provision for storing a sufficient supply of water by the erection of a dam, and in many cases the construction of a reservoir or pound, and this again in many localities would be liable to silt up, and require much labour to keep it clear. The numerous cases in which water-power has been entirely superseded by steam, and the still greater number in which the latter is used as an auxiliary, tend to prove that there are few cases in which water-power can be applied with unmixed advantage. Supposing steam-power to be employed, a portable engine has many advantages over a fixed one. Equally useful for the home operations, it is available at any part of the farm. The grain crop may be threshed in the field and carried to the granary, or sent at once to the factor, should the state of the markets render it desirable.

There are few districts where the owner of a portable engine may not at least clear the cost of its repairs by letting it out to his neighbours, and this, where the farmer has to make his livelihood from his farm, is a point of some importance.

Again, the obvious tendency of the present day is to substitute steam for horse-power in many even of the field operations of the farm. Competition among implement-makers, and the stimulus of the prizes offered by and the publicity gained at the Shows of the Royal and the various local Agricultural Societies, have already been the means of producing such machines as the draining-plough, the steam-plough, and the traction-engine,—which, though perhaps not perfect, and only adapted at present to particular soils, will doubtless be improved upon year by year, and prove only the forerunners of numerous implements which

may eventually almost displace horse-labour in the heavier field-work.

On the whole then, except in certain situations which are so few that they may fairly be called exceptional, a portable steam-engine appears to be the best motive power the farmer can adopt.

Having thus shortly stated the principles which should guide the farmer in the erection of a homestead, we have endeavoured, in the plan now submitted, to point out how they may best be carried into effect; and, to render these more intelligible, we append a short description of the arrangements we propose.

EXPLANATION OF PLANS.

1. *The Stackyard*.—This is placed in the rear of the barn, but the limits of the plan do not admit of its being shown. Supposing 150 acres of corn to be grown, at 40 bushels per acre, room will be required to stack 750 quarters. A stack containing 20 quarters will generally be found a convenient size, as a machine of ordinary power will thresh out two in the day, so that none need be left unprotected during the night.

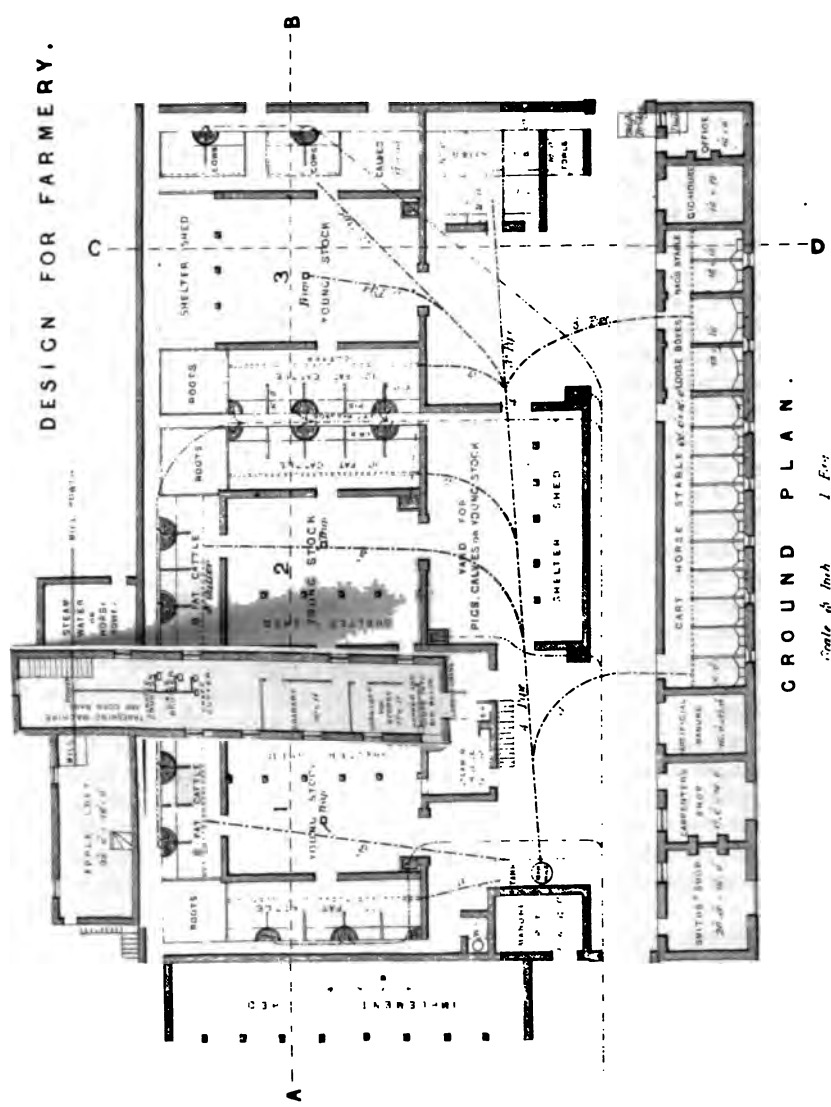
To contain this quantity, the staddles should be about 12 feet in diameter, so that 35 would be required. These would be arranged in rows to suit the convenience of each particular case, a space of 25 feet being left between each row, and the stacks being placed about 10 feet apart in the row. Staddles of the best description are those of cast-iron with iron framing. A low wall (say 4 feet 6 inches in height) will in most cases be the best fence.

2. *The Barn*.—A barn of the size shown in the Drawing (25 ft. $\times$ 14 ft. 9 in. $\times$ 9 ft. 6 in. high) will be found of a sufficient size to stow away from 100 to 125 bushels of wheat in sheaf on the ground-floor. Above would be placed the threshing-machine; and, if considered expedient, a straw elevator, similar to that introduced by Mr. Parsons at Lord Portman's farm at Lambrook, might be fixed; but it is doubtful whether, in a homestead on a small scale, the saving of labour would be such as to render it worth while to incur the cost of such a piece of machinery.

On the same floor should be fixed the cake-bruise, chaff-cutter, and other implements which will be connected with the steam-engine or other power. Under the chaff-cutter we propose to place a chaff-room. If steam-power is employed, the quantity of chaff cut at one time will necessarily be large, and require some special provision; if not, such a room may be used for many purposes.

The straw-barn and hay-house are placed contiguous to and communicating with the barn and near stables between the two

DESIGN FOR FARMERY.



GROUND PLAN.

Scale 1/4 inch = 1 foot

principal yards. Over these, and forming a continuation of the upper floor of the barn, are the granary, 20 feet by 11 feet, and the corn-loft for horses. The latter may be fitted with hopper and shute into the corn-bin below. Access to this floor is obtained at one end by a staircase in the barn, at the other by steps and landing outside the hay-house, where a crane may be fixed. We think this arrangement will be found to be convenient and economical of labour.

Feeding-Houses and Yards.—The number of cattle fattened on a farm of 300 acres will depend on the mode of cultivation pursued and the quality of roots grown. In the plans submitted, there is accommodation for 46 bullocks. The stalls are eight feet wide; in each of which two bullocks may be tied. This plan has been found to answer well, and takes up less space than a six-feet stall appropriated to each. The divisions between the stalls extend only three feet from the crib; this is sufficient to keep the heads of the animals apart, and perhaps allows them more room to lie. A passage three feet wide in front of the cribs, the same at the foot of the stalls, and a crib three feet wide, will allow seven feet for the length of the stalls. If desired, by sinking the bottom of the stalls a few inches below the surface, most of the advantages* of the box system may be obtained without the expense necessary to carry it out to its full extent.

Besides the accommodation for the fatting beasts, there is shed and yard room for from thirty to forty young cattle. There is also housing for four cows, with a calf-pen. Probably this is more than would be required on an arable farm, but the buildings could readily be converted to other purposes.

We have provided pig-styes, of course; and also a smaller yard, with a shed divided off into eight-feet spaces for pigs. This will not be found too much room in most cases; but, if few only of these animals are kept, the yard will be valuable for yearling cattle, or perhaps more so for sheep. The practice of wintering these latter under cover, appears to be yearly increasing, and probably at no distant date a sheep-yard will be considered an essential part of a first-class homestead.

These sheds, however, should, if possible, be placed to face the south.

Stabling for ten farm-horses, two loose boxes, and a two-stalled nag-stable with a gig-house are provided. The stables are all lighted and ventilated by windows in front, and should have air-bricks built in at the head of each stall. Thus, the roof space not being filled up with a loft or tallet, the ventilation would be very good. The kind of fittings proposed will be seen from the

* This plan has been adopted by Mr. Joseph Gould, and several other farmers in this neighbourhood, for many years.—Ed.

detailed drawings and specification. It will be sufficient to say, that, while strong and neat, all unnecessary expense in mere ornament has been carefully avoided.

It has not been considered necessary to provide a harness-room; as the space at the back of the stable is unbroken by windows, there will be ample room for the purpose there.

The arrangement adopted will not allow of the implement-shed being within the yard, without a considerable and unnecessary extension of it. It is therefore placed near the farm entrance of the yard. It would be merely an open shed to lean against one of the feeding-houses, and resting on pillars in front. The closing in of such a shed with doors, &c., as it is merely a shelter for the rougher implements, would be an unnecessary expense.

A steaming-house and smith's-shop, with carpenter's-shop, and a house for artificial manures are provided, as each seems requisite to carry out a good system of farming on the scale proposed, and, in cases where one or other of them is not required, there are many other purposes for which the room would be desirable.

A manure-pit near one of the entrances to the yard, and a covered tank adjoining, with which the various yards are connected by trapped drains, a fowl-house, privy, and offices, are matters of minor importance, but each tending to the perfection of the whole.

The temperature of the fattening-houses is regulated, and ventilation secured, by sliding shutters in front and an arrangement of the crease, which is simple, inexpensive, and has been found to be effectual.

It is of importance that all the buildings should be spouted, to carry off the water that would otherwise fall into, and wash away, the best constituents of the manure, as well as to keep the foundations of the building dry. A well-placed gutter will answer.

A cider-house, with apple-loft and cellar, placed adjoining the barn, that the power may be available for the mill, is added as generally necessary for farms in the West of England.

The arrangement of the homesteads as we have proposed, readily allows of expansion or contraction, according to the size and circumstances of any particular farm.

Thus one or more additional yards, with fattening houses and sheds for young cattle, may be added on adjoining to the yard No. 1, and the additional length thus gained would give room for a proportionate lengthening of the stables and other buildings in that row, for a harness-room, which might then be requisite, and one or more additional pig or sheep yards. The implement shed might also be included within the yard-walls.

If a homestead for a smaller farm were required, the centre

yard, No. 2, might be omitted, and the stabling, &c., reduced in proportion.

The expense of erecting a homestead, in accordance with the foregoing plan and the specification which follows, would be about 1800*l*.

This estimate does not include the cost of the pipes and taps for the water supply, of the stackyard fence, of saddles, of power of any description, or of any preparations for fixing the same, or of a chimney-shaft for a steam engine.

All fittings, such as cider-mill and press, weighbridge, &c., are also omitted.

The total amount exceeds the limit imposed in the conditions; but, according to the prices ruling in the district for which the estimate is made out, the work could not fairly be done for less.

The cost might be reduced by omitting certain portions of the design. In each particular case the farmer would be able to judge how much, or what part, he could leave out with the least inconvenience.

For instance, the cider-house might be dispensed with on many farms, which would take 130*l*. from the cost. The nag-stable and gig-house might not be deemed essential by every farmer; or, if fewer young cattle were kept, the range of buildings, including the cow and calves'-house, might be omitted, and one or more of the shelter-sheds converted to the same purpose; or these latter, and also the yard and shedding intended for pigs, might be dispensed with altogether. Again, if the chaff-room were not required, a reduction in a somewhat expensive range of buildings would be effected.

The cost of the different buildings, at per foot run and at per 1000 * cubic feet of contents, would be as under:—

Fattening-houses	.. ..	£1 16s.	per foot run	
Implement-shed	.. ..	1 3	per foot run	
Shelter-sheds, average	.. ..	1 0	per foot run	
The barn	.. ..	14 0	per 1000 cubic feet	} Not in- cluding the roof space.
The cider-house	.. ..	12 10	per 1000 cubic feet	
The straw-barn and granary	.. ..	10 0	per 1000 cubic feet	
The stables	.. ..	20 0	per 1000 cubic feet	
The carpenter's shop, office, and other buildings in the same range as the stables	.. ..	14 0	per 1000 cubic feet	

Annexed are the prices on which the estimate is based, and

* The authors' estimate, given per 100 feet, has been multiplied by 10, to bring it to a cube of 10 feet each way. It is presumed that the authors reckon the total cost, and merely omit the cubical contents of the roof from the number of cubic feet by which that cost is to be divided.—Ed.

which are paid in a district of West Gloucestershire, about 12 miles north of Bristol (all delivered):—

Stone	..	..	..	2s.	per yard
Brick	..	..	..	35s.	per 1000
Lime	..	..	..	25s.	per 100 bushels
Ashes	..	..	..	2s. 6d.	per load
Elm	..	..	..	2½d.	per foot superficial for 1 in. stuff
Baltic timber	..	..	..	3½d.	per ditto, ditto
Slates	..	..	..	9l. 10s.	per 1000
Labour:—Masons, carpenters, and most tradesmen, 4s. per day					
Labourers	..	..	..	..	2s. 6d. ditto.

The expense of the pipes and taps necessary for a water-supply, as shown in the drawings, will be about 25l.

SPECIFICATION of the sundry Works required in the Erection of a set of Farm-Buildings in accordance with the design of Mr. J. Y. STURGE, of Thornbury, near Bristol, and Mr. T. W. P. ISAAC, 13, North-gate-street, Bath.

Excavator.—Dig all trenches of the required dimensions, tanks and other earthwork necessary, ram to the walls as the work proceeds, level the surface of yards and unpaved floors, and remove to a convenient distance all superfluous earth or rubbish.

Mason.—The walls to be carried up with native stone, in the positions and of the various thicknesses and heights shown on drawings, in random courses, with mortar composed of fresh-burnt stone-lime and ashes. Through-stones in every 2 feet 8 inches superficial, the whole well bonded together, and the courses flushed up with grout. The footings of the one-story walls to be 22 inches thick, two-story 26 inches, laid upon large flat stones (those to engine-flue, and piers, to be solidly built and grouted 6 inches larger each way, and the brickwork commenced on flat stones).^{*} All wood story-posts, or supports to roof-timbers, as also the iron standards to the stable partitions, to rest upon a stone slab not less than 6 inches thick, fixed firm and level upon the footings, roughly axed and levelled, and sunk to receive the footpost. Two and a half-inch coping to the walls of the yards, projecting 2 inches. A liquid manure-tank to be formed, in the position shown on plan, with brick, the top to be arched 4½ inches, in cement, and the inner half brick of sides also in cement, with an 18-inch manhole with cover and ring. Fix 6-inch air-brick 3 inches above the floor in each stall. Pave the office, steaming-house, gig-house, stables, carpenter's and smith's shops, with hard common bricks flat in mortar. Lay 3-inch drain-pipe from the yards to the tank. Provide and fix blocks of stone 9 inches square by 6 inches deep, properly morticed, to receive posts of stable-stalls. Provide and fix stone blocks 12 inches square by 4 inches deep, properly cut out to receive grates and stench-traps. Provide and set in mortar flags to form turnip-cribs in beast-houses and beast-sheds where directed; also for floors of cider-house and cellar, chaff-room, hay and straw barn. All external walls to be neatly pointed with dark mortar; pitch the sheds with hard stone well grouted, laying pipes with trap to manure tank, as required. Form steps in Pennant or other hard stone to corn-loft and apple-loft, with 1 foot heads and 6-inch risers; slate troughs holding 100 gallons each, in the positions marked in plan.

^{*} This only to be inserted, if steam-power is employed.

Carpenter and Joiner.—Construct roofs and supports as follows:—

(1). *Two Shelter Sheds by Barn.*

Of Memel fir	{	Principals	9 × 2
		Tie	9 × 2
		Lintel	6 × 4
		Strutt	6 × 2
		Purlins	4 × 5
Of larch, common rafters		.. ..	4 × 3
Of axed elm, story posts		.. ..	6 × 6

(2). *Implement, Fat Cattle, Cows, and Calves' Sheds.*

Of Memel fir	{	Principal	9 × 2
		Tie	9 × 2
		Lintel	6 × 4
		Strutt	6 × 2
		Purlins	4 × 5
		Wall plate	4 × 3
Of larch, rafters .. ..		.. ..	3 × 3
Of axed elm, story post		.. ..	6 × 6

(3). *Fat Cattle Shed, Queen-Post Roof.*

Of Memel fir	{	Principal	9 × 3
		Tie	9 × 3
		Queen-post	9 × 3
		Collar	8 × 2½
		Purlins	4 × 5
		Lintel	9 × 4
Of larch rafters .. ..		.. ..	4 × 3
Of axed elm, story post		.. ..	6 × 6

(4). *Barn and Cider-House.*

Of Memel fir	{	Rafters with ties to every rafter ..	4 × 2
		Ties	3 × 2
		Wall plates	4 × 2

(5). *Stables and South Range of Buildings.*

Of Memel fir	{	Rafters with collars	4 × 2
		Collars	4 × 2
		Wall plate	4 × 3

Ridge-and-valley piece 1½-inch thick, and of sufficient depth to receive rafters.

The whole of the foregoing Memel timbers to be from the saw, as also the larch. The elm posts to be dressed with the axe only. The whole of the roofs to be firmly framed together with the necessary straps, bolts, or other iron work. All timbers not straight, or partially round, to exceed the dimensions given. No rafter to exceed one foot apart. All the slated roofs to be battened with 2½-in. by ¾-in. battens, and to have diagonal or 1-in. by 5-in. tilting fillet at the eaves. All valleys to have ¾-in. boarding upon proper bearers. Inch poplar stairs in barn and cider-house. Wood bricks to be built into the walls where required. Strong oak lintels 18 in. wider than their respective openings over all wall openings.

Doors.—All the doors to be ledged, formed of Norway battens slit into half their thickness, with door-frames of Christiana deal 4½ in. by 3 in. : 3 in. of the first-mentioned dimension to appear within the opening, at 6 in. from

the external surface of the wall. The barn door facing the stackyard to be double running, on iron rod, with friction roller, as shown in details. The entrance gates to be sawn and framed (and to fall against elm stops fixed in the ground), and hung with hooks and bands, and to have suitable fastenings. Common oak field-gates to the entrances to the different yards hung to one foot square oak-post. The pigsties to have a wicket ledged and braced door, hung with hooks and bands.

Windows.—The windows of the barn and cider-house to be of Christiana deal 3 ft. by 3 ft. of the description shown on drawings. The upper part to be glazed, the lower to have ledged shutters $\frac{1}{4}$ -in. thick, the same to close into a rebate $1\frac{1}{2}$ in. deep, and shut with the ledges of the shutters flush with the inside surfaces of the frame, transom, and mullion. The granary windows to be of Christiana deal 3 ft. by 3 ft., as shown on plan, filled with lattice work; the lattice frame of the shutter to be 2 in. square, and the lattices $\frac{1}{4}$ -in. thick, 2 in. apart, and slanting half-square downwards; the shutters so constructed and hung, that closing into a rebate 2 in. deep, they will shut flush with the inside surface of the window and mullion. The windows of the stable to be circular, 20 in. diameter, set in a stone case 27 in. square and 6 in. thick, with a groove in its thickness to admit the frame, on which the window swings, on pivots, at the extremities of its horizontal diameter, and within which it is to close when shut. The face of the stone case to project about 1 in. beyond the external surface of the wall. All other windows shown upon plans to have cast-iron square lights 4 in. by 3 in., glazed with crown glass, with stays and fastenings complete.

Floors.—The floors of the barn, granary, corn-loft, and apple-loft to be formed with Memel joist 10 in. by 2 in., and $1\frac{1}{2}$ -in. poplar boarding. One row of herring-bone to each floor. The granary and corn-loft floor to be properly ploughed and tongued with sheet-iron girting $\frac{3}{4}$ in. wide.

Fittings.—The openings between the story-posts in the cattle-boxes to be filled up with 1-in. deal battens 3 in. wide and set 3 in. apart. A frame of 1-in. deal-battens, 3 in. wide and set 3 in. apart, to slide behind so as either entirely to close the opening or regulate the width of the same. The division of the cattle-boxes to consist of $3\frac{1}{2}$ -in. rough quartering, nailed to tie-beam and boarded across with $\frac{1}{2}$ -in. elm-slabs. Semicircular cast-iron water-troughs, 1 ft. 9 in. radius, to be fixed in each pair of cow and cattle boxes. The cribs in the cattle-boxes to be of oak, 2 ft. at bottom, 3 ft. at top. A channel to run the length of the cattle-boxes, with a cast-iron grating opposite every 2 stalls for the urine to pass into a 3-in. earthenware socket-pipe to the liquid-manure tank. The partitions of the stable to be of Norway battens, slit into half their thickness, clamped together by stuff of the same thickness at the top, the middle and the bottom fastened by a wooden-pin through each upright batten, and held at the lower end of the stall by a hollow cast-iron pillar $5\frac{1}{2}$ ft. high and 6 in. external diameter, set with a square flange into a plugged block of stone, the pillar being furnished with flanges to form grooves to receive the ends of the cross-battens or rails. A channel to run the length of the stable, furnished with a cast-iron grate to each stall, through which the urine may pass into a covered drain below, and be conveyed from the building by means of a 3-in. earthenware socket-pipe to the liquid-manure tank. The mangers and rack to be of iron, a $1\frac{1}{2}$ -in. cast-iron rod forming the top part of the manger, which is in the midwidth of the stall and extending from the front of the manger to each side of the stall, curving a little outwards at the ends. At the upper part of the rod, extending beyond the manger, is a flange to which $\frac{3}{4}$ -inch malleable iron-rods are to be rivetted, and also to a piece of flat iron against the wall. This forms a rack at each side of the manger, the top of the whole being $3\frac{1}{2}$ ft., and the bottom of the rack about $1\frac{1}{2}$ ft. above the floor of the stable, the whole secured by means of screw-bolts passing through the wall

at a distance from each other of the length of the manger, in front of which are rings to fasten up the horses. Ventilators to be fixed as shown in roof of stable.

Slater.—The roof to be covered with Duchess slates, on battens 2-in. by $\frac{3}{4}$ -in., cut out of Russian deal laid one-third open. Freestone crease, every alternate crease-tile, to be lifted by strips 2 in. thick, and the width of the rafter, to be laid on top of rafter a foot down from the wall of the lean-to sheds to form space for ventilation.

Plumber, Painter, and Glazier.—A cast-iron barrel-pump to be fixed in communication with the tank. The water to be laid on to the slate-cisterns provided in all the yards and cow-boxes with 1-inch galvanized wrought-iron lap-welded tubing, regulated in the cisterns by $\frac{3}{4}$ -in. ball-cocks. All the valleys to be laid with 5-lb. milled-lead, and all necessary flossing to be done of the same material; all external woodwork from the saw to receive a coat of coal-tar; the remainder three coats good oil colour; best seconds Newcastle crown-glass, well puttied to top of barn and other windows as required. A copper-boiler, 3 ft. diameter, in steaming-house. A 2 ft. 10 in. register-grate in office. 4-inch half-round cast-iron shutters to all eaves, with proper stacks communicating with the drains.

General Conditions.—The contractor is to perform the whole of the works in the very best manner, with the very best and most approved materials and labour of their respective kinds, under the direction of, and to the entire satisfaction of, the architects; to provide, fix, and execute all works which are specifically represented, or implied in or by this specification, or in or by the drawings thereby referred to or either of them, or which may be requisite for rendering every part of the buildings, works, and appurtenances complete, and to make good all damage caused by the execution thereof, without any charge of any kind thence arising or becoming due, except the amount of the consideration of the contract; and the architects are to have power to order any alterations in the form of the structure or of the finishing thereof, without vitiating the contract, and the difference of expense (if any) caused by any such alteration so directed shall be ascertained after the rate of the schedule of prices hereto attached; and if such schedule be found in any manner deficient, then the aforesaid architects are to calculate and determine such additional prices as may be requisite, the same being after the same rate of cost and profit as those contained in the said schedule. The contractor to state separately in his estimate the expense of different parts of the buildings, especially that of cattle-sheds, at per foot run, and that of the barns and other enclosed buildings at per cubic contents. The cost of the south range of buildings to be separately given. The contractor will state the diminution in the amount of his estimate supposing the water-supply to be entirely omitted.

J. Y. STURGE.

T. W. P. ISAAC.

X.—Barnstaple Exhibition—Arts and Manufactures Department.

By DR. SCOTT, Deaf and Dumb Institution, Exeter.

It was a wise resolution of the Council of the Bath and West of England Society to include in the objects of its exhibition at Barnstaple articles of pure and industrial art.

Agriculture and manufactures are intimately connected and mutually dependent on each other. The progress of population attending on the growth of manufactures calls for increased

supplies of food ; and the energy necessary to produce this food at a cheap rate requires every aid of mechanical and chemical science. But further, the wealth and the intelligence attendant on agricultural and manufacturing progress create a demand for the refinements of life, and by consequence lead to the cultivation of the Fine Arts.

There are also peculiar facts in England tending to a free interchange of objects of interest among Englishmen. Ethnologists have told us that Englishmen are the offspring of many nations, and to this mixture of blood we owe our indomitable energy and untiring industry. Geologists also tell us that, with one comparatively insignificant exception, England enumerates amongst her strata all that are known ; and to this variety of rock and soil she owes her character of being essentially both an agricultural and a manufacturing country. Nothing is one-sided in England. Her rich valleys and her broad uplands are as much significant of her wealth and power as her clays, her ores, or her coal-measures ; and he who considers her greatness as belonging to only one of these peculiarities sees only half her power. Class prejudice in this country has rarely made itself felt amongst us for any length of time. Now and then, when a passing political cloud has darkened the social horizon, we may have heard mutterings of the thunder ; but it has soon passed away, and left us more convinced than before that England's real welfare is in unity, and that the only motto significant of her true interests is "One and all."

In the West of England doubtless we are more intimately connected, in the first place, with agriculture ; and the Society may be said to have judiciously applied its first efforts in assisting to develop this branch of our resources. But now that the Society's labours for the improvement of agriculture have reached so high a point, it is well that other interests, in which we are all more or less concerned, should be attended to. We all have need of a great variety of articles of domestic use, and we desire to have of these the best ; hence we require to be taught how to buy. How to select is not always an easy matter, especially where ornament is concerned. Moreover, if we have to keep pace in in this part of England with the rest of our countrymen in arts and manufactures, exhibitions are demanded. It is well known that during the last ten years, in various parts of England, exhibitions of objects more or less connected with taste have been called for by the necessities of the age. Nay, of such importance has the subject been considered, that Government has found it desirable to form a museum of industrial art, a part of which is constantly moved from place to place throughout the country. This collection, at the solicitation of the President of the Society,

has been permitted by the Government authorities to be exhibited at Barnstaple. Since the year 1851 the importance of exhibitions has been generally acknowledged, and most of the large towns in populous districts have had them at various intervals. Unfortunately such collections cannot be formed without funds, and towns of a moderate size cannot always raise the necessary money to meet the expenses they entail. Hence in a district like our own, thinly populated, with its larger towns widely separated, it is only by means of a society like this, extending over a wide area, but gathering together annually large numbers of all classes, that such an experiment could be fairly carried out with a reasonable chance of usefulness to the visitors, and without loss to its promoters.

There is another point of view in which the question may be looked at. The district over which the Society extends is not solely agricultural. Manufactures of very ancient date are studded along its rivers; the tall towers of its mines are seen rearing their lofty heads on many a hill, and the rich quarries of its marbles, granites, serpentines, &c., furnish ornamental stone-work to every part of the kingdom. There are also some clay-works in the West of yearly and increasing interest and importance. So that, as a manufacturing district, the West of England is not to be despised; and a great mart, like the one proposed, where specimens of the raw material and of the manufactured goods of the district could be exhibited to large congregations of the people from all parts, must open out many sources of sale not hitherto thought of. To the manufacturers themselves it will afford a valuable lesson, by enabling them to compare their works with those of others, and see wherein they can teach or learn: to both of which exercises of their mental faculties they will no doubt often find themselves called.

In all the recent movements for extending education amongst the people, one thing has been strongly felt, viz., that their education should be practical—that they should indeed be made acquainted with the various “common things” by which they are surrounded. And a collection of this kind is a museum of such things, in which care is taken to provide the best specimens of each, so that both knowledge and taste may be improved.

In the letter addressed by Mr. Acland to the *Journal of the Society of Arts*, he says, “The object of the extended exhibition is to engraft on the rapid improvement in agricultural produce and machinery a corresponding improvement in taste, and thereby to extend the local demand for works of art and manufacture, whether useful or ornamental, of the highest quality and the best design.” This paragraph implies a truth which is now an acknowledged principle with all who have paid attention to

the cultivation of the public taste,—that education in the beautiful can only be properly carried out by submitting articles of beauty frequently to the eye, and accustoming it to their influence. No mere reading about beauty or taste will ever give a love for the one or form the other. It is not many years ago since England became fully alive to the fact that, notwithstanding her enormous capital and the perfection of her machinery, many of her manufacturers were excluded from the foreign market, and solely on account of their inferiority of design. So much was this then felt that a committee of the House of Commons was appointed in 1836 to inquire into the facts of the case. We remember that Mr. Martin, the celebrated painter, complained of the want of correct design in the china trade; Mr. Papworth of the inferiority of decorative interior architecture and furniture; Mr. Cockerell of the bad styles of architecture arising from a want of education in the arts. The same want of artistic skill was complained of in many other branches of decorative art, and thus the sad spectacle was exhibited of a nation enabled to produce a better article as regards material, yet unable to compete with the foreigner solely for want of artistic power. It was out of this inquiry that the "schools of design" arose, which have since been modified and become what we now have as "schools of art."

To develop properly any branch of trade, there are two parties to be considered: the producer and the consumer—the seller and the buyer. Unless we have a steady demand for an article, we shall never have a steady supply. Unless we have persons who can appreciate improved and beautiful designs when placed before them, and purchase them in preference to inferior ones, we shall never get artists fulfilling the conditions we want. The education of the producer, therefore, and that of the buyer must go on simultaneously, or works in good taste will not be permanently produced. Our designers will always be in marketable art very much what our taste makes them. Decorative art is always in much more danger in this respect than the fine arts. The painter and sculptor depend for the sale of their works on the educated few—men who are rich, and purchase individual works at large prices. But designers for manufactured goods produce articles which must be sold by thousands in order to give a profit, and if the people do not know good from bad works, there is no certainty that any attempts will be made at improvement, since it is better to continue a well-known selling pattern than to produce a better whose sale would be uncertain. It may be very fairly questioned, whether we have not always had artists amongst us skilful enough to produce fine designs, had the manufacturer been justified by the educated state of the buyer in paying the artists their price. The want in this country has never been of

skill to produce, but of taste to appreciate what is produced ; and the only safe method now to insure improvement in design is to thoroughly cultivate the taste of the people. England has never been without eminent artists, and the great designers of all times have been the eminent masters, and not persons merely educated for trade-art. Flaxman, Bailey, Stothard, Bell, &c., have all been designers of trade articles, but such men require to be properly recompensed ; and where there is no certainty of sale, the manufacturer must speculate the higher by employing such talent, which all safe and careful tradesmen are unwilling to do. A well organized arrangement for bringing before the people at all convenient seasons objects of beauty and utility, has become a work of national importance ; and this Society, in taking the initiative in the matter, has begun a great work, and made a movement which, if successful, will go further.

Moreover, in these days, when every effort is made for the moral improvement of the people, it must be borne in mind that there is a closer connexion between correct taste and correct morals than is generally supposed. A learned writer says : "A taste for the fine arts goes hand in hand with moral sense, to which indeed it is nearly allied : both of them discover what is right and what is wrong ; fashion, temper, and education may vitiate both, or preserve them pure and untainted : neither of them is arbitrary or local, being rooted in human nature and common to all men."

Exhibitions of arts and manufactures were first commenced by the French in the year 1798, since which time they have held several. Every successive exhibition has shown a marked improvement over the one which preceded it. At the first there were only 110 exhibitors, and in the one held in 1844 there were 3969 exhibitors ; while in the Crystal Palace of 1851 there were no less than 5084 persons who received medals or honorary mention for their articles shown. In commencing exhibitions in England it was thought that trade jealousies might arise which would have an injurious tendency, but the contrary has been the result : for every exhibitor seems to feel that if he has secrets to tell his neighbour, so his neighbour has something to teach him ; and thus a fair exchange of advantages takes place. Those public collections have also enabled us to compare the manufactures and art of various countries, and to observe the strength and weakness of the workmen of each. Thus it has been noticed that the English workmen beat the French in veneering and fixing the joints of furniture, while French workmen beat ours in the management of the lathe and chasing tools. Such are the practical lessons that workmen get from these collections, independent of the general benefits they bestow on all.

While these advantages, however, have existed so long for the residents of populous districts, and those wealthy enough to travel long distances, there are still large numbers of people to whom they are a dead letter; and the time appears now come to remedy the evil.

The Council of the Bath and West of England Society formed a distinct Committee to carry out the needful arrangements; which Committee appointed Mr. Acland its Chairman. The first step of this Committee was to collect a sufficient sum to meet the expenses such a movement would involve. Mr. Drewe was appointed the Chairman of a Subscription Committee for this purpose, and he has since placed in the Treasurer's hands a considerable sum as the result of his unremitting labours. The Council have, therefore, without drawing on the resources of the Society raised for agricultural purposes, anticipated the wishes of the people in adding this branch to its already interesting and instructive exhibition.

In the memorandum prepared by Mr. Acland it is stated that there were two modes of carrying out the exhibition: "either to endeavour to arrest public attention by a large and improving collection of objects of interest, or to begin on a small scale, commensurate with the means already at command, looking forward to further expansion if called for by the wants of the Society." The latter plan has been adopted; taking care at the same time to make the collection as perfect both in kind and quality as the means would permit.

In providing for the security of valuable and perishable articles it was thought essential to provide at least one building which should combine the qualities of perfect stability, resistance to the weather, and good light, and which should at the same time admit of being removed at little cost and without difficulty. After much discussion, a plan embracing most of these requisites was agreed upon. The design was furnished by Mr. Nicholson, a well-known agricultural engineer of Newark. In the arrangements for this building, as well as in the adaptation of the canvas-sheds, very valuable assistance was rendered by Mr. Gray, the steward of shedding. The building is 100 feet long by 40 feet wide; the roof is supported by trusses constructed partly of wood and partly of iron at intervals of 20 feet: no rafters are required. The roof is formed of strips of corrugated iron, 7 feet $\times$ 2 feet, which reach from purlin to purlin. The wood is all fastened together by pieces of angle iron joined by bolts and screws. Light is admitted along the whole length of the roof for about 5 feet on each side of the ledge. Under the glass are louvre boards, which provide for ventilation. The sides are boarded, and in the event of wet weather an additional wall of

canvas will be added to secure an interval of dry air as a protection to pictures and other works of art.

The next care of the Committee was to draw up forms of preliminary inquiry to be distributed to persons likely to become exhibitors, with the view of ascertaining what objects would be sent, the quantity of room each person would require, and the nature of the protection which the articles would need. For all articles, except water-colour drawings, space was to be paid for, at prices according to the nature of the building in which they were to be placed. The following is the tariff of prices charged :—

Kind of Protection provided for the Articles.

Uncovered Ground	U. G.	price 6d. per square yard.
Open Shedding	O. S.	1. price 2s. per foot run, 20 feet wide (the Society's ordinary shedding).
" "	" "	2. price 3l. 10s. for Compartments, 20 feet wide, 14 feet frontage.
Enclosed Shedding	E. S.	1. price 3s. 6d. per foot run, 20 feet wide.—Regulation 6. N.B. Half the space must be left vacant as a passage for visitors.
" "	" "	2. price 2s. 6d. per foot run—for space for counters not exceeding 5 feet wide under sheds similarly enclosed.
(This charge does not include the cost of the counters. Carpenters will be in attendance at fixed rates of charge.)		
" "	" "	3. price 1s. per square foot for small articles requiring less than 20 square feet.
Special Protection and Glass Light	S. P.	price 1s. per square foot horizontal, for trade articles including Ornamental Art, &c. also 1s. per square foot hanging space for ditto.

[If Exhibitors send their own glass-cases these charges will be open to revision in the particular instance.

The Society does not undertake to pay carriage except under very special circumstances.]

The 1st of April was at first fixed as the day on which these papers were to be returned, but it was afterwards found necessary to lengthen the period till the 16th of April.

From the papers now returned, it is found that several branches of manufacture will be well represented at the Exhibition. We shall have good collections of cutlery and other hardware, of philosophical instruments, decorative ironwork, bronzes, fire-arms, carriages, harness, furniture, &c., &c. But the most extensive, and probably the most attractive, part of the exhibition will be its glass, pottery, and lamps—branches of manufacture to which England, during the last few years, has paid great attention, and in which it has indisputably made much progress. On the latter two of these important articles of daily use we shall make a few further remarks.

EXHIBITION OF CANDLES AND LAMPS.

No necessity or comfort of domestic use has undergone a more marked improvement in modern times than the means of producing artificial light. The uncertain flicker of the old tallow dip has been replaced by the elegant "stearic mould," or classic "moderator." The flambeaux by which we were formerly lighted through dark thoroughfares of our cities by half-drunken linkmen, are things of history, while street-lamps shine on the passers-by with such brilliancy as almost to make us forget there is such a thing as darkness. The chief exhibitors at Barnstaple in this department will be "Price's Patent Candle Company," and the Messrs. Thomas of Exeter. The Messrs. Price, or rather their intelligent representative, Mr. Wilson, has done much for candle-making. He has raised the trade from a dirty piece of empiricism to an interesting scientific pursuit; and to instruct the visitors to the exhibition he is to send a variety of articles which will show the different materials used in their manufacture, and the changes they undergo. The following is a list he has furnished of the specimens to be sent to Barnstaple:—

- No. 1. Palm-oil in its raw state as boiled out from the pulp surrounding the nut of the *Elais Guineensis* on the west coast of Africa.
- No. 2. Palm-oil after treatment with sulphuric acid at a high temperature.
- No. 3. Palm-oil after treatment with sulphuric acid and distilled.
- No. 4. Acid treated distilled palm-oil after cold and hot hydraulic pressure—"Belmont sperm."
- No. 5. Liquid expressed from the distilled acidified palm-oil—"oleic acid."
- No. 6. Residuum of distillation.
- No. 7. Raw palm-oil.
- No. 8. Pure palmitic acid.
- No. 9. Oleic acid.
- No. 10. Pure distilled glycerine.

Such are more particularly the stages of the material used in Price's patent candle making. The Company also exhibit the following as more or less connected with the subject of their manufacture.

- No. 11. Wood-shavings to escape the paper duty (160 cuts to the inch of plank) for making night-light cases.
- No. 12. Coir or cocoa-nut fibre used as press mats.
- No. 13. Petroleum in its raw state as imported from Rangoon.
- No. 14. Sherwoodole.
- No. 15. Belmontine oil for burning in lamps.
- No. 16. Belmontine.
- No. 17. Oil for lubricating spindles, machinery, &c.—a substitute for sperm oil.
- No. 18. Night-lights and glasses—not drop-grease candles—Belmontine candles—Belmontine oil and lamps—Glycerine soap and Gishurst compound for killing the blight on plants.

On reading over this list of articles we learn that in addition to the animal fats so long used for candle making, two other

materials, viz., palm-oil and petroleum, are used; and in their preparation for this purpose, they are resolved into their different elements. Fats are constituted chiefly of three elements, viz., stearic acid, margaric acid—both solid matters—oleic acid, a liquid oil, and glycerine, a syrupy substance. It was found that all these substances were not all equally good illuminators, and therefore to make tallow or any other fatty substance best fitted for burning, it is necessary to get rid of that constituent which has the effect of reducing the illuminating power. This substance was found to be glycerine. Now ever since the time of Chevreul—the father of modern candle-makers—who began his labours in 1811, the efforts of chemists have been directed to get fatty bodies separated into their elements. It is unnecessary to enumerate the different patents which have been taken out on the subject, but the last secured by the Messrs. Price in 1854 deserves notice. It is a great desideratum with all commercial chemists to separate compound bodies without injury to the simple elements, and the struggle has been in this case to arrive at this end. Formerly glycerine had, in the process of separation, been destroyed or obtained in a very impure state, but by the process now patented, all the ends are completely attained, and we have not only the “Belmont sperm” and oleic acid, but the pure glycerine—the sperm for the candles, the oleic acid for soap or other purposes, and the glycerine, available for an almost infinite variety of purposes.

In the list of articles before us we have “No. 1. Palm-oil, the product of the *Elais Guineensis*.” This tree is very remarkable, and has long been one of the most useful in the wide district of Western Africa: from this fact it has been termed the “native’s friend.” To the inhabitants it yields wine, oil, and “cabbage” (the young sprouts) as articles of food; it also furnishes them with materials for fishing-tackle, baskets, hats, and for various other purposes; and since its application to candle-making, it has become to them an article of exportation of great value, and as such likely to stop the traffic in slaves, and be the chief means of carrying civilization and Christianity into the heart of savage Africa. In a very interesting account of the manufactory published by Mr. Wilson, he remarks on the importance of emigrants and travellers investigating the various natural productions which they may meet with in the new districts into which they penetrate. He says: “It has always been the endeavour of the Company to encourage and assist as far as possible the introduction and importation of new fatty materials, vegetable and animal.” A few years back, at the suggestion of Sir William Hooker, he noted down a few simple directions, some of which we quote here in the hope that should they meet the eye of some young

agriculturist intending to seek his fortune in a distant land, they may be useful to him.

"In times of peace, with tallow at average prices, every oil or grease, whether solid or liquid, if not poisonous or acrid, viscid or gummy, may be considered to be worth in London at least 30*l.* per ton. Waxes are worth more than greases on account of their very high melting points; their relative values depend upon colour, transparency, and freedom from resinous matter. Resin may easily be detected by lighting a small piece of wax: the more the smoke the greater proportion of resin, and, therefore, the less the value; the paler and more transparent the wax the better. A simple way to try an oil nut is to crush it with a stone, and then squeeze it between your finger and thumb; if it contains any considerable quantity of grease enough will be pressed out to judge of the colour, hardness, and sweetness; if the nut tastes oily, and yet oil does not come out by this treatment, it is well to dry the kernel before squeezing; and in the case of nuts containing grease solid at a high temperature, it is well also to previously heat the nut. When a stearic candle can be got, burn it down a little until it has formed a cup, then blow it out; place into this a little of the material to be tried; after a moment's burning the candle material with which the wick is saturated is burnt out, the new material in the cup takes its place, and becomes the material supplying the wick until the cup is emptied, and so can be judged of. The points connected with new greases &c. that we should be most thankful for information upon are—the manner of growth, probable expense of collecting, means of transport, and quantity likely to be obtained, with small specimens of the grease, if manufactured, and of the fruit, with both its husk and hard shell, where these exist."

We must now return for a moment to Glycerine, one of the most remarkable products brought into request by modern commerce. Though this substance had been discovered by Scheele, it has only very recently obtained any position as an article of general use, and now it is said to possess so many uses, that one hardly knows where it may not be applied with benefit. We saw that in candle-making, however, it was a positive evil; but since it has been purified and brought out in its sweet syrupy nature, its applications have been endless. First, as a medical agent, it has been used successfully in diseases of the skin, in sore lips, burns and scalds, in confluent small-pox, as a wash for the hair, &c., &c. Again, it is used as an antiseptic to preserve meat and fruits, and it is said that mixed with a little water it makes a most delicious beverage to drink on a warm day. This most useful substance then, that in 1845 was considered only as a kind of chemical curiosity, and could be hardly obtained, has by the efforts of Messrs. Price's candle-making been brought into the market in large quantities at a moderate figure, and been found to administer, in the manner we have stated, to the uses and comforts of mankind.

The employment of Petroleum or Rock oil, in candle-making is of still more recent date than that of the Palm-nut. The Birman Empire has been long known as producing this substance in great abundance, and the town of Re-nan-gyaong is the centre of

a small district, where there are some hundred Petroleum-wells in full activity. The Petroleum in districts where it abounds has long been used by the lower classes for burning in lamps, and, when mixed with earth and ashes, for fuel. The Belmontine candle is an exceedingly elegant production; it is hard, very transparent, and gives a beautiful light. In addition to this solid substance, there are also obtained from the Petroleum Sherwoodole, a spirit used for cleansing fabrics from stains and grease spots, and Belmontine oil for lamps and lubricating machinery.

The use of lamps for producing artificial light has been much increased by the introduction of the "Moderator," a comparatively recent French invention. The Messrs. Thomas, of Exeter, send several beautiful examples to the Exhibition, and also a skeleton lamp, to show how the oil is pressed up into the wick. The use of lamps is of very early origin; some of the most interesting specimens of ancient pottery are the remains of lamps. Pictures of lamps are also found in the old frescoes on the walls of Herculaneum and Pompeii. Some of these exhibit taste and elaborate workmanship, but they are frequently grotesque and whimsical in their design. It does not appear that in these early lamps there were any mechanical contrivances either to force the oil into the wick with greater impulse than that which is gained by capillary attraction or to supply the flame with any increase of oxygen. The most common form of early lamp was a circular middle, which formed the reservoir for oil with a handle at one point, and a nozzle at the other extreme with an aperture for the wick, altogether very much resembling a small teapot. The wick was simply a few twisted threads drawn through the hole in the upper surface of the lamp, with no glass shade to defend the light from being destroyed or render it steady by protecting it from the wind. These lamps when depicted are always carried by the slaves, the *cubiculares*, as they were termed, who attended the bedchamber. It is supposed that the custom of burning night-lights was first introduced in the luxurious age of the Emperors. These were always attended by the *cubiculares* till daybreak to keep them burning and properly trimmed. Till a comparatively recent period we had very little improvement on this primitive form of artificial light. In the old lamps almost of our own day—certainly in that of our fathers—we had simply the arrangement of the twisted wick let into the oil, which by capillary attraction brought the liquid up to the end exposed to the atmosphere where it was burnt. Where we had thick impure oil the flame produced was very imperfect, and the smoke and smell were very disagreeable, and the necessity of frequent snuffing was very inconvenient. There was no contrivance either to increase the oxygenation of the flame, nor attempt to force up

oil through the wick. In 1789 Ami Argand made a great step by inventing a burner which permitted air to come in contact with both the exterior and interior part of the flame—this is still known as the “Argand burner.” This vastly increased the oxygenation of the flame and consequently improved the light. There then followed several attempts to improve this lamp, and we have had the *Astral* lamp, the *Hydrostatic* lamp, *Barton's* lamp, &c., &c., all of which attempted to improve the supply of oil to the wick. From the glutinous nature of oil its rise by capillary attraction is impeded, and an effort was made to obviate this by placing the reservoir for the oil near to and above the flame, so that it might be kept up to boiling point, where it assumed a more liquid state. This arrangement, however, much impeded the light and so disfigured the whole apparatus, that it had but little countenance from the public. The spirits, camphine and naphtha, being highly inflammable and much less viscid than oil, were next employed, and certainly much improved the light both in quantity and colour; but there was given off from the latter a painful and oppressive odour, which operated much against its adoption, and the former being so highly inflammable rendered it dangerous to be trusted in the hands of incautious domestics; owing to this cause it was not generally approved by the public. From these circumstances manufacturers began to despair of making lamps a really prized domestic requisite, when the invention of the “Moderator” at once changed this opinion, and gave both to rich and poor a truly valuable light at a comparatively small cost. The Moderator, as we have already stated, is of French invention and of very recent date. A lamp had been for some years used on the Continent, where the oil was thrown up into the wick by the means of a kind of clockwork inside the lamp. This is known as the *Carcel* lamp, but it was very expensive, very liable to get out of order, and was never much known in this country, though it may fairly be considered as having originated the principle which has since been simplified and rendered generally practical in the Moderator.

In the Moderator the oil, by means of a spring inside, is pressed up through a tube of small diameter to the wick; the spring being wound up something like a bottle-jack. It was found that the force with which the oil came through this tube, especially when the spring was first wound up, was too great, so a small piece of iron rod, like a thick knitting needle, was introduced into the tube, leaving sufficient space between it and the sides of the tube, to allow the oil to flow very freely, but yet to suppress any squirting tendency which there might be, and from this piece of iron rod, called a “Moderator,”—from moderating the flow of oil,—the lamp has received its name.

The next thing to getting a good principle in a lamp is to get a really good and pure oil. The oil used for the Moderator is the "Colza," or rape-seed oil. This oil has never before been much used in this country, except for lubricating machinery, and now our supplies are nearly if not altogether from France, where much attention has been paid to its growth and purification. Unless the oil is completely freed from its mucilage, it not only produces a smell but a diminished light, and also renders the internal spring and its adjuncts very liable to get out of order. The colour of the light and smoke, however, depend very much on properly trimming the lamp. If the chimney shoulder be placed much above the wick the oxygenation of the flame is weakened, while, if it be placed below it or even on a level with it, the draught of air is so great as almost to blow out the light. The proper arrangement therefore has been found to be for the shoulder of the chimney to be about half an inch above the wick, and where combustion is most complete, there is a freedom from smoke and the light is of the best colour, viz., nearest approaching to white. These lamps have opened an opportunity for exercising good taste in their design, and we hope that in this respect they may be the means of bringing beautiful and correct forms into general use among all classes. And we would conclude our notice of this subject with one or two hints in this respect. Do not let them be overdone by excess of ornamentation, either in colour or form; the simpler both are kept the better. In so small a body when overcrowded by ornament this fundamental form is lost altogether, and it becomes a mere piece of fret-work. When colours are introduced, let it be well considered how they will look at night and not merely by daylight, and let all the colours be considered as to producing rich tones and harmonious relationships rather than as to working out pictorial subjects. But of all things remember to let the fundamental shapes be of the present and simplest types of beauty: and here the study of the Greek forms may be of the most essential service. The materials of construction should be light; dark ones, like bronzes, absorb the light and render any forms upon them perfectly inappreciable by means of the light from the lamp itself. Indeed dark substances produce a gloomy and heavy effect that is very disagreeable. Opal and porcelain, and these combined probably with glass, appear at present to be the most desirable substances for these candelabra. It is only by combining simplicity of form with practical convenience in articles of every-day use, like the lamp, the tea-urn, the water-jug, &c., that the mass of the people will ever get correct ideas of pleasing forms; and let us hope that the time has arrived when this diffusion has got a new impulse, and that we shall no longer consider a thing beautiful

because it is expensive or rare, but test it upon its true merits and love it for its own sake.

EXHIBITION OF POTTERY.

Amongst the most important and useful articles of domestic use is pottery. Pottery has now for some years been one of the staple trades of this country. There was a time when our wares were not known beyond our own shores, but now we can hardly enter a city in Europe in which they are not to be found. This great revolution was mainly the work of Josiah Wedgewood. Before his time English pottery was of an inferior quality as to materials, and still worse as regarded the taste shown in the design. The ware was chiefly of a dirty white colour, and the forms were copied from the worst patterns of Chinese manufacture. But Wedgewood, by the introduction of his terracottas, his basalts, his jaspers, and his biscuits, at once raised British pottery to a high state of excellence. For the production of designs Wedgewood employed the highest talent, and to the skill of Flaxman we owe most of the fine conceptions which Wedgewood has embodied in his pottery. He first introduced pure geometrical forms, in articles of common use, and also more generally introduced the finest Grecian and Etruscan shapes. Since his time much attention has been paid to the subject, but nothing finer has been produced.

The remains of pottery are amongst the most precious relics left us by bye-gone nations, and by these alone almost we can follow the footsteps of the most wandering of people. We find in this island remains of pottery manufactured by its earliest inhabitants, while the Roman progress through Britain can be definitely marked by potsherds, and Egypt, Greece, and Ancient Italy have all become better known to us by means of their urns, waterpots, and vases.

All pottery is formed of plastic clay, which by labour, skill, and taste is made to assume the required form and texture. Potters class their productions under two heads: *Pottery* and *Porcelain*. The former name is applied to all ware that is opaque and cannot be seen through; while the latter is much more compact and shining in its texture and possesses a large degree of transparency.

Both these classes are again divided into many others, which it would take a volume to illustrate, but the principal are the *soft pastes* and the *hard pastes*, which with some difference are equally applied to porcelain and pottery; *e. g.* :—in porcelain the terms have reference to its capability of resisting heat, but in pottery they more particularly refer to the different proportions of the component parts as well as the degree of heat applied in the

bakings—the test of the paste here being whether or not it can be scratched with a knife. Again some are *glazed*, and some *unglazed* or *mat*, while other specimens are *enamelled*; but, as we have already stated, to go into detail on this subject would require a volume.

It would appear that potters have been held in much more honour than they are in the present day; for it is recorded that at Numa a college of potters was established, and Charles III., who founded the celebrated manufacture at Capo de Monte, moulded the clay with his own hands, while the Mesdames Pompadour and Dubarry have both left their names intimately connected with the ceramic art.

In our own district at Bovey Tracey many persons are employed in manufacturing the more ordinary kinds of pottery; but though this is the only place where pottery is manufactured in this neighbourhood, both Cornwall and Devon are rich in the raw material—potter's clay. De la Beche says that "37,500 tons of this mineral matter are annually shipped from the district to the Potteries," and he gives the value of the whole export of clays (1838) as not less than 43,500*l.*, an item of some moment in the yearly revenues of our district. This clay is the detritus of decomposed granite rock, and is found in several parts both of Devon and Cornwall. The clay exists in some parts, as between Teignmouth and Bovey, in natural beds, and at other places it is artificially prepared. The chief ingredient in the decomposed granite which it is desirable to secure is the felspar, but with this there is also frequently associated much quartz, and the great object is to separate these and get the felspar as free as possible from impurities. The mode in which this is done is thus described by De la Beche:—

"The decomposed rock usually containing much quartz is exposed on an inclined plane to a fall of a few feet of water, which washes it down to a trench whence it is conducted to catch-pits. The quartz and other impure particles are in a good measure retained in the first catch-pit; but there is generally a second or even third pit in which the grosser portions are collected before the water, charged with the finer particles of the clay, is allowed to come to rest in the larger tanks or *ponds*. Here the china-clay sediment is allowed to settle, the supernatant water being withdrawn as it becomes clear by means of plug-holes in the sides of the tank. By repeating this process the tanks become sufficiently full of clay to be drained of all the water, and the clay is allowed to dry so much as to cut into cubical or prismatic masses of about nine inches or one foot sides, which are carried to a roofed building through which the air can freely pass, and where the cubical or prismatic lumps are so arranged as to be dried completely for the market. When considered properly dry the outsides of lumps are carefully scraped and exported to the Potteries, either in bulk or in casks, as may be agreed upon."

This clay is also called kaolin. The kaolin used at the celebrated Sèvres manufactory is procured from St. Yrieux, near Limoges, and that used at Dresden from Aue in Saxony.

When the clay is brought to the pottery it is kneaded and brought into such consistency as will best adapt it to receive the desired forms, which are given either by the potter's wheel or by moulding or casting. The potter's lathe or wheel is a small circular stage, placed horizontally, and supported on a vertical shaft, to which a rotatory motion is imparted. The prepared clay is placed upon this stage, which is made to revolve rapidly, and by the hand of the potter, in a manner somewhat resembling the method used in the common lathe, the required shape is given. All circular forms are produced in this manner, while vessels, and the parts of vessels, not so shaped, are moulded by hand or cast. The articles at this stage are rough and very porous. To give them durability and a better appearance, they are covered over with a liquid of a creamy consistency, containing some substance capable of being vitrified. After receiving this coating, they are put into an oven, and submitted to a heat strong enough to produce vitrification. If a pattern is desired, this is either transferred from a print in oil, specially produced for the purpose, on thin paper of peculiar texture, or else painted on by hand before the glaze is put on; and as the glaze is transparent, the colours of the pattern are seen through it. The common glaze is composed chiefly of lead and silex.

The most celebrated porcelain works now in Europe are those of Sèvres and Dresden. The works, however, of this latter place are really at Meissen, a town 14 miles distant. At Sèvres the manufacture is carried on by the government, and many works of great value and elaborate workmanship are annually produced. Many eminent chemists have been connected with this establishment, and it is somewhat remarkable that all the governments of France, however they may have differed in other respects, have agreed in supporting the manufacture of Sèvres.

No objects of interest have more devoted collectors than has "old china." Cups of noted manufacture have been sold for 40 or 50 guineas. In the museum to be sent to Barnstaple from the Department of Science and Art, there is a vase belonging to her Majesty the Queen valued at 2000 guineas. This vase is of Sèvres manufacture, but of a kind and colour not now made. This museum is rich in specimens of ancient pottery, and with the assistance of the catalogue, and under the guidance of Mr. Worsnop, the intelligent and obliging curator, it will afford visitors an opportunity of making acquaintance with the "Majolica," "Fayence," "Palissy," and most of the other wares which have at various times been produced in Europe, as well as to see genuine specimens of Oriental manufacture.

The advance of the art in England is of recent origin. About the middle of the seventeenth century the brothers Elers, from

Holland, established a small factory at Burslem in Staffordshire. It will be remembered that Delft, a town in Holland, had for a long time nearly supplied England with its pottery ; in fact, till within the last half century, delft was the ordinary name for pottery in this country. In the Burslem factory the Messrs. Elers remained for some time, carefully guarding their secrets from every one. A person, however, named Astbury, feigning to be an idiot, got into their employment, and so obtained their secret ; whereupon the firm quitted Burslem in disgust and settled in London. It was some time after that Wedgewood's genius presided over the ovens of Burslem, and gave us those fine productions that are still the admiration of every one.

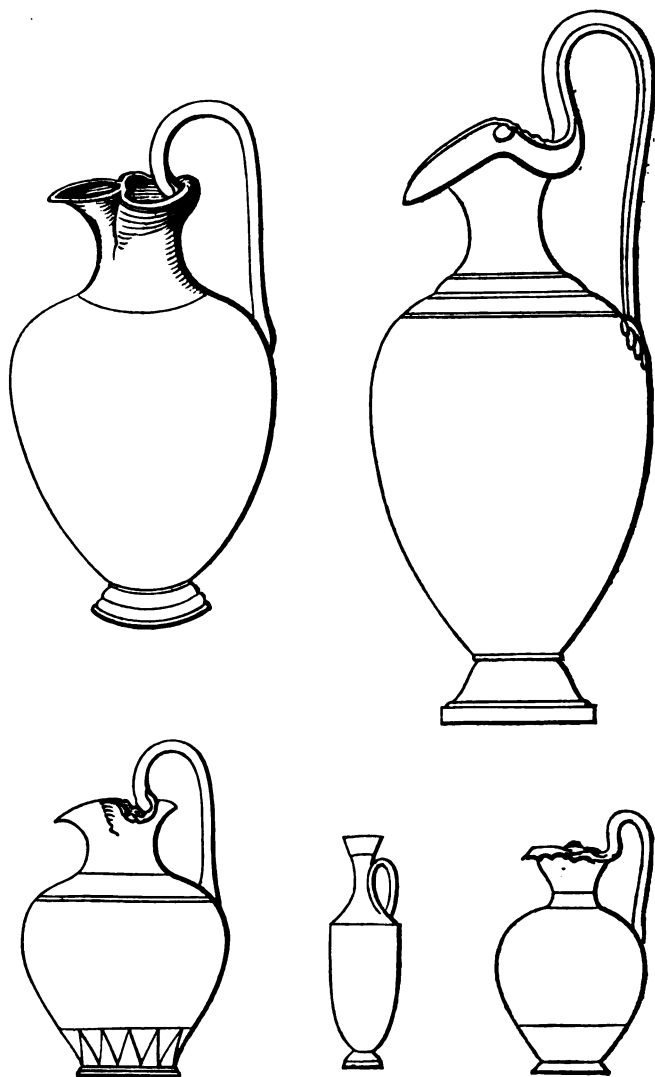
We have in the Kensington contribution to the Exhibition specimens of the various kinds of porcelain which have at different times been manufactured in this country. One of the earliest manufactures, and one which had considerable success, was at Chelsea, near London. The paste for this ware was made of Alum Bay sand, plastic clay, and powdered flint-glass, and this was covered by a leaden glaze. In 1748, the manufacture was transferred to Derby, and, in 1751, Dr. Wale established a manufacture at Worcester, which, we believe, still exists. A Mr. Cookworthy, of Plymouth, about the year 1768, discovered kaolin and Cornish stone, and, by introducing these into the manufacture, he gave the ware a greater hardness and translucency, thereby conferring upon it more of the character of the German and Oriental productions. We find, however, in a note to Polwhele, it is stated that the difficulties which Mr. Cookworthy and his coadjutors found in proportioning the materials properly so as to give exactly the necessary degree of vitrification and no more, and other niceties with regard to the manipulations, discouraged their proceeding with the concern at Plymouth, after they had procured a patent and expended upon it from 2000*l.* to 3000*l.* They then sold their interest to a Mr. Champion, of Bristol, who endeavoured to carry on the business on an extensive plan, but after some years, having met with misfortunes, abandoned the undertaking and withdrew to America ; so that these early attempts to naturalize the manufacture in our neighbourhood proved abortive, although the raw material was found upon the spot.

The small beginnings of the brothers Elers have now swelled into mighty proportions ; the Staffordshire Potteries now cover an area of 8 miles by 6, and employ about 70,000 operatives. Here, too, we have the firms which are now adding fresh lustre to British manufacture, and likely still to continue so to do, viz., Messrs. Copeland, Minton, Wedgewood, Alcock, Pratt, Meyer, Mason, &c.

Though Wedgewood did so much in his productions to secure a taste for good designs, even in articles of common use, and

showed that it was in geometric forms well applied we should look for them, this has not prevented often a sad falling off in attempts where change has been sought for, and apparently without any object but for change.

The following are a few samples of Greek forms, simple yet beautiful, as an illustration of the principle that vessels of ordinary use may be made more pleasing to the eye by good shape than by the addition of tawdry and showy ornament:—



Egyptian and Etrurian vases always give us a pure curve, from whatever point of sight we view them; and it has been stated—speaking generally—that every section of them will either give us a circle or an ellipse.

It is far better in ordinary articles—as indeed it is in all—to depend for giving pleasure on the fundamental form rather than on after ornamentation. No decoration will ever make a bad form beautiful, and a good one satisfies us with very little. It is like what we once heard a friend say regarding a lady's wearing rings: a hand that is beautiful does not require them, while they only draw attention to a clumsy one. The Sèvres manufactures are frequently unfortunate in their forms, and appear to have more attention paid to their colours and other decoration than to the beauty of their shapes. It will be generally found that a good shape naturally results from an attentive consideration of the use of the article in question, its mechanical requirements, whether for holding, standing, pouring, or the like, and from a thorough appreciation of the material of which it is made. If to these conditions be added the hand of a good workman, and the absence of all trick to attract notice, the result will generally be satisfactory to the cultivated eye.

We had intended treating of glass and one or two other branches of manufacture in the same manner as we have done that of pottery, but we have already filled our allotted space. On the subject of glass we could, however, say that it was not until recently that the English maker had a chance with his foreign competitor, owing to the duties imposed upon this material; since these have been removed, English glass-making has received a strong impulse, and the productions now manufactured in this country need not fear comparison with those of any other. The examples to be furnished by the Barnstaple Exhibition will fully bear out this assertion, for we have entries from some of the most celebrated English firms.

From this hasty sketch it will be seen that the scheme has been successful, so far as to call into action, on the part of the manufacturers and dealers, a desire to exhibit; and we can only hope, on the other hand, that the public will respond by a full attendance, and thus prove that there is a desire, both on the part of buyers and sellers, to promote an improved taste and a more cultivated judgment in all works both of art and manufacture.

In conclusion, we may add that many of the branches of industrial art exhibited will give practical exemplification of those two great principles of good art which ought never to be lost sight of, viz.—

First, that ornament should be consistent with the construction

required for real use, not the construction made to fit to a pattern chosen for the sake of ornament, just as a horse's shoe should be made to fit the foot, not the foot be fitted to a ready-made shoe.

The second principle is, that the natural qualities of the material should be considered in framing the design, whether for construction or ornament, the opposite error being very common, namely, to borrow patterns invented by the workers in stone, wood, or iron, and attempt to reproduce the pattern in some material for which it was not intended. Each material has its own natural qualities, and therefore its own style.

These principles, acted upon by all great artists and good workmen, were first popularly set forth in words by Pugin, in his lectures on the 'True Principles of Pointed Architecture,' published in 1841, a work in which furniture and ornament of all kinds are treated of. The principles are being carried into practice at the New Oxford Museum, of which an account is just published by Dr. Acland and Mr. Ruskin. Much information may also be gained from Wornum's 'Analysis of Ornament,' published in 1856; and Sir G. Wilkinson on 'Colour and Taste,' published in 1859.

The use of the History of Styles of Ornament.

"This is the view then with which we study the history of art—to discriminate and individualize the styles of the various epochs; and by thus developing distinct character, multiply to an equal extent our means of viewing nature, and our powers, consequently, of representation. The real result of historical knowledge, therefore, is not the mere copying of what has been done before, but the acquisition of a power which not only supersedes all copying, but which alone will ensure the production of that variety of ornamental design, which, the simplest theory must make manifest, is the ostensible effort of every designer.

"The great lesson we may learn from a study of the characteristics of style is, that our designs want individuality: they are too general, too much alike: we require something more than mere sprigs and colonnades or conventional scrolls. We want both systems of detail and systems of arrangement. A picture is not an ornament: but every flower, however simple, and indeed every leaf, is capable of being converted into an ornament by the mere aid of repetition on a geometrical basis; and the same forms may be beautifully varied by altering this basis; and again, by new judicious combinations of colour, applied to the same geometric scheme."*

The Greatness of Samos due to its Art.

"The great success of the Greeks was not more than commensurate with the strict adherence to principles of beauty upon which even their slightest efforts depended. The cheap manufactures of antiquity, as the ordinary Greek terracottas, were cheap by reason of the nature of their material, not from any neglect of care in their manufacture.

"The ancient prosperity of the Samians is a remarkable instance of the

* 'Analysis of Ornament,' by Ralph N. Wornum, p. 110.

great national benefit to be derived from the judicious application of art to manufactures, and is worthy the emulation of their modern British competitors. The small island of Samos, by its potteries alone, carried on an important trade with all the great cities of the Greek and Roman empires, and thus was enabled to compete in splendour and luxury with the greatest states of the ancient world. Herodotus (iv. 152) speaks of the unparalleled fortune of a Samian merchant. It was the first Greek state that attained celebrity in the arts. Its temple of Juno, the famous Heræum, was, perhaps, the most celebrated art-repository of antiquity, and was itself a work of extraordinary grandeur. The same Greek historian (iii. 60) speaks of it as the largest temple he ever saw, though it was constructed entirely of marble. The workers in metal and the painters were equal in renown to the sculptors and architects of Samos. All this magnificence was but the fruit of its industrial ingenuity, its skilful ship-building, its enterprising commerce, its matchless potteries. The skill of its potters made the very soil they trod upon more precious than gold. This earthenware of Samos carried its commerce over every sea, to every port, until its merchants became princes; and this small island-state was conspicuous among the richest nations of the world. It was this distinction, this political pre-eminence, which excited the jealousy of its more powerful neighbours; and with its freedom, its commerce and its prosperity declined together.

"The sun still shines on the fruitful valleys of Samos, and it still abounds in the valuable clay of which its ancient potteries were manufactured, but its population have declined into a mere scattered and rude peasantry; its potters have departed; the genial clay, without the skilful hand to fashion it, is of little avail.

"Such was Samos when it directed its energies to the arts; such is it now that all cultivation of Art has ceased. It was but the judicious application of art to industry that made this small Levantine island once the illustrious rival of great empires."*

XI.—An Elementary Introduction to the Principles and History of Art. By T. D. ACLAND, Jun.

WHAT is the purpose of the "Arts Department" added to the Exhibition of Live Stock and Implements at Barnstaple? This question has been often asked during the last few months, and many different answers have been given.

These are some of the answers:—

To please the farmers' wives, while the farmers are handling the Live Stock, or discussing the merits of the Implements.

To promote the general trade of the district by circulating a knowledge of useful inventions in domestic economy.

To diffuse a taste for elegance and novelty of design, in place of old-fashioned and clumsy patterns.

To make known the best productions of the West of England, whether natural objects, as metals, marbles, and slates; useful manufactures, as pottery and woollens; or ornamental, as silk, gloves, and lace.

To promote the sale of drawings and pictures by native artists;

* 'Analysis of Ornament,' by Ralph P. N. Wornum, p. 111.

or to stimulate the love of pictures, by exhibiting works of the highest class.

Or, lastly, to give a fresh point of interest to the North Devon Meeting, for the benefit of the town of Barnstaple, and for the replenishment of the funds of the Society.

In each of these answers there is some truth, and, in all taken together, enough to show that the scheme proposed has awakened inquiry and interest.

The purpose of the following remarks is to explain, in a popular and connected form, the objects aimed at by the promoters of the Exhibition. It will be obvious to anyone in the slightest degree acquainted either with the literature or the practice of the Arts, that this paper is strictly introductory and elementary. It is written in the hope that there may possibly be some readers who will not think it disrespectful to restate very simple truths in homely language. For them alone, with the hope of adding to their fireside happiness, does the Author write on a subject on which it might otherwise seem presumptuous in him to offer an opinion. Such opinions as are here submitted have no claim to originality: some of them are derived from well-known books; but more from the correction of traditional or novel dogmas by practice, and by happy hours spent in the society of Artists. With this intention, it is proposed:—

1. To show what is the meaning of *Art*: its general relation on the one hand to the useful labours of an Agricultural Society, and on the other to the higher social interests involved in the education of the people.

2. To take one particular department of the Exhibition—that of *Fine Art*, and explain the reasons for its introduction, and also for the limits assigned to it on the present occasion.

First then, what is Art?

Art is the skilful use of means to an end. Art begins in experience, and goes before Science. Art teaches us what to do, and how to do it. Science teaches us the reason why. For one person who learns the reason why work is done in a particular way, there are a dozen who are content with knowing how to do the work; and it is well that it is so: as the wise man said of old, "The object of life is not knowing, but doing."

CLASSIFICATION OF THE ARTS.

It is difficult to draw a precise line between the several branches of the Arts; but they may be classified in a general way as follows:—

Useful Art.
Decorative Art.
Imitative Art.
Creative Art.

The Useful Arts are those which minister directly or indirectly to the necessities or comforts of life, without reference to beauty. Such are the Arts which supply the materials of food and clothing, and the art of building as distinct from architecture, and the manufacture of machinery.

The Decorative Arts are those which give a pleasing shape or colour to useful objects, or to actual ornaments: such, for instance, are the ornamental functions of the cabinet-maker and the house-painter, the art of carving wood or stone, the ceramic art (pottery), and the textile art (weaving); but in fact, as objects of utility must have some shape, whether ugly or pleasing, the distinction rather applies to the manner of work than to the actual Art employed.

The Imitative Arts include all cases in which Art is employed to produce a likeness, as it is called: it may be the portrait of a living being, of a landscape, or of any other visible object; but a portrait or a landscape will be a poor thing, if it is a mere mindless copy of the original. And therefore the Imitative Art runs into the confines of the highest form of Art, viz. :—

Creative Art, under which term may be included every effort of human skill to embody the conceptions of the imagination and fancy, in such a form as to produce the desired impression on the mind of another. This will embrace, for all their higher purposes, Painting, Sculpture, and Architecture, and also Poetry and Music. The Drama is sometimes called an Imitative Art; but it may more fitly be considered as Poetry employing the Imitative and Decorative Arts.

The *Imitative* and the *Creative Arts* are usually classed together under the common term of *Fine Art*.

The true *Artist* has a divine gift and a mission to teach mankind; whether he paints a portrait or a landscape, whether he embodies the conceptions of his own imagination, or illustrates a fact of history, or a passage in a poem,—in either case he has a tale to tell. That tale is not mere imitation. To this subject we shall recur hereafter, in treating of the water-colour drawings at Barnstaple.

THE RELATION OF THE ARTS TO SOCIETY.

Art, then, in its lowest and earliest stage, has for its object the supply of the common wants of man—food, clothing, and lodging. Till these are satisfied there can be no rest of mind, no leisure, no thought for beauty. In the infancy of civilized states among the ancients the many were the slaves of the few, and were compelled to minister, not only to their pressing animal wants, but to their indolent habits, to their pleasures and luxuries; and even in the present day we see illustrations of

the same principle: the chief of a savage tribe and the native prince of India are each surrounded with a profusion of ornament—feathers and beads in the one case, gold and precious stones in the other. In a higher stage of society,—along with the growth of commerce, the prosperity of towns, and a national literature,—the true Artistic genius finds its scope, its patrons, and its popular admirers. Such, as we shall see presently, was the state of Greece in its best days, and of Italy just before the Reformation.

The period during which the Arts attain a high degree of excellence is usually succeeded by a time of feeble imitation, of fashionable luxury, often by a crushing despotism. Art loses all vigour, truth, and freshness. Literature is filled with petty conceits: the faint echoes of the thoughts of dead men, repeated by voices incapable of uttering the wants of the living, and therefore unable to guide them.

Such was the state of Rome under its emperors; such, in some respects, the state of Europe during the 18th century.

We trust that, by God's mercy, we live in better times now. The revival of earnestness in religion, the return to simplicity and truthfulness in poetry and popular literature, the prodigious energy of discovery in science, with its effect on commerce and on agriculture, the spread of rational principles of liberty—all these things conspire to awaken a national life which cannot fail to find its counterpart in the Arts. But, if our present condition has its own advantages, it has also its peculiar risks. Excessive competition and the cheapening of manufactures foster habits of self-indulgence and vulgar finery in the purchaser, while they tend to depress the great artist and the good workman. Among the antidotes for these evils, are good education, and an appreciation of great works; and to both of these public attention is forcibly directed.

HISTORICAL SKETCH.

What has been now said, in a general way, may be cast in a more detailed form, with a slight sketch of the most important periods of Art.

The first Art in the history of the world was the tillage of the ground—the sweat of the brow for the fruits of the earth. At the dawn of society we find the Chosen Race engaged in the care of flocks and herds. We also meet with the building of cities, with artificers in brass and iron, and with such as handle the harp and the organ.

At the time of the Flood men said to one another, "Let us make brick and burn them thoroughly." They lived on an alluvial or clay soil, and probably had no lime: they had "brick

for stone, and slime for mortar," the slime being a sort of pitch.

Thus history hints at the origin of the Arts of Agriculture, both the tillage of the soil and the care of live-stock, the manufacture of tools and implements and of instruments of music, brick-making and pottery; nor must we forget the carpentry implied in the construction of the Ark.

In Egypt may still be read the earliest uninspired history of the world, embodied in monuments of art, running back far beyond all records contained in any book except the Bible.

The subject is too extensive and too difficult to be treated of here: suffice it to say, that the ordinary popular accounts trace to the Valley of the Nile, and its settled population, the arts of systematic agriculture, and of land-measurement as the foundation of geometry; while the Pyramids and Temples are a standing witness to the early attainments in architecture.

The history of the Jews makes us acquainted with considerable advance in the dressing of skins and in the manufacture of woven fabrics, as well as a high development of the art of the carpenter and the mason. But it is remarkable that the agricultural population of Judæa did not provide its own craftsmen for the building of Solomon's Temple: they came from Tyre.

If we pass now from dim traditions and monumental records to the period of profane history (omitting, in order not to complicate our subject, many interesting phases of human art in the East and even in America), we may concentrate our attention on certain great periods of human literature and art, by which we are influenced every day of our lives, in our private houses, in our sacred buildings, and in our public works.

These periods are:—1. The Greek, five centuries before Christ; 2. The Roman, about the Christian æra; 3. The Gothic of the Middle Ages; 4. The Italian, just before the Reformation.

GREEK ART.

After the great kings of the East, with their Persian hordes, had been rolled back into Asia by the courage of the little free states of Greece, the Arts attained, in the fifth century before Christ, a perfection which, in some departments, has never been since equalled in any age or in any country.

The evidence of this high state of Greek art still exists in buildings, in statues, in bronzes, in vases, and in coins. Samples of all of these may be seen in the British Museum. The relics of Greek Art are to this day the foundation of the studies of the artist, and for this reason: they rest on Nature, and on certain fundamental principles of proportion, which, whether we fully understand them or not, have exercised, and still continue to

exercise, an unmistakeable influence over the minds of educated men.

The influence of Greek Art in its own best days was not confined to the small spot of Greece alone. It was closely connected with the development of a maritime power and a colonial system; and it is still to be traced over many of the islands of the Mediterranean, and over a large portion of the surrounding continents.

ROMAN ART.

The Arts, as practised at Rome about four centuries after the time when the constellation of poets, historians, and artists shone in all its brightness at Athens, were essentially different. The Romans were not, in any high sense of the word, artists, nor were they, even as poets and orators, original.

The Romans were farmers, soldiers, lawgivers. They conquered and administered the world—that is to say, the world as it was then known, namely, the countries round the Mediterranean Sea, and across Asia to the Persian Gulf. They made great progress in power and wealth; and over their whole empire, wherever they established a colonial or provincial government, they showed their power by the erection of bridges, temples, theatres, aqueducts, baths, and whatever could minister to public convenience or even private luxury. But whatever they knew of art they borrowed from the Greeks; and what they imitated they debased and corrupted—they made it magnificent in scale, but they lost all sense of the refinement which is the charm of Greek Art.

The one great step forwards made by the Romans was the adoption of the *Arch*, by which they were enabled to bridge over large spaces never dreamt of by the Greeks, who only laid stones horizontally from pillar to pillar. The amphitheatres of the Romans, not only in Italy, but in the South of France, are a standing record of the greatness of the world's masters; they left their mark on England in the construction of military roads and camps, still to be seen at Dorchester. Their domestic life, the utensils of their kitchens, the trinkets even of the ladies' toilets, are revealed by the disinterment of Pompeii from under the ashes of Vesuvius.

Roman Art has had a great, and not always a favourable, influence over modern European building and furniture; but the admirer of pure form will ever turn to Greece as his guide. Roman grandeur and magnificence attained their height, amidst monstrous wickedness and corruption, about the time when our Saviour brought a new life into the world. The misery of the people, the utter prostration of heart and mind among the edu-

cated, has hardly any parallel in the history of the human race. The cup of woe was full; the old world sunk under its own weight. The ancient literature dwindled into contemptible weakness; and finally literature and the arts were destroyed under the terrible scourge of the barbarian invaders. Slowly did the Church struggle with the brute force of ignorance, becoming itself after a time hardly less ignorant than the rude warriors who divided Europe amongst them.

The art of the middle ages was at first only a coarse imitation of Roman forms, having a wild and rich beauty and a grotesque grandeur of its own; of which some idea may be formed from the towers of Exeter Cathedral and the Norman arches of churches, such as St. Germans; but the cathedrals of Winchester, Durham, Peterborough, and even Gloucester, will give a more clear idea of Norman work.

The Norman conquest of England was followed by a period of great energy in construction: nearly all the old Saxon churches were replaced by magnificent Norman structures. The Bayeux tapestry, executed under the orders of Queen Matilda, wife of William, and the painted glass supposed to have been executed in the twelfth century, give proof of early attention to the arts of design, and of a sense of beauty and harmony of colour, growing up amid the strife of the barons.

The Building and Art of Europe to the close of the twelfth century of the Christian Æra, tell of the lingering influence of Rome. They have therefore, to speak generally, been included under the term *Romanesque*.

The thirteenth century ushers in a new period, which extends to the Reformation.

GOTHIC ART.

It is needless to discuss here the question how the Gothic Arch was invented, and how far it grew out of the mechanical elements of former structures.

It is important to notice, that the intercourse with the East brought about by the Crusades was followed by a rapid development of a new style in Architecture in France and England; that this was accompanied by efforts in sculpture remarkable for the beauty of the work produced. Some of the best sculpture of the Gothic period may be seen on the front of Wells Cathedral, and some, though not equal to that of Wells, at Exeter.

The living spirit of Christian Art burst forth in forms of exquisite beauty, such as the world had never seen before; although they grew in some sense out of the Roman and Romanesque forms which preceded them.

The point to be specially noticed in Gothic Art is its *freedom*.*

All the Art of the ancient world was more or less slavish; long horizontal lines unbroken; fixed proportions of column and frieze; unvarying types of capitals repeated over and over again; doors, windows, and pannels—all parallel lines, or at right angles. Such was the spirit of Pagan beauty seeking perfection on earth; and finding it, but finding it how? in a cold earthly ideal, of which the utmost that can be said is, that it makes gods or rather idols of human reason and human passion: the one cold, severe, and geometrical; the other veiling the grossness of sin and sensuality under a beautiful exterior *form*.

How different was Christian Art! The individual man had been called into full life; slavery had disappeared; workmen were organized in fraternities; and each man's bent and genius found its place. Every capital, every window, *was different*; instead of cold clearness and uniformity, we find a marvellous mystery, full of life, full of beauty, and yet all conspiring to form one great whole.

Many of the great architects of the middle ages are unknown; but some were great bishops, and have left a name behind them, and are blessed by many a scholar who owes them his education. Among them may be mentioned William Wykeham, the founder of Winchester School and New College, Oxford.

The true spirit and growth of Gothic Art did not last above two centuries, say from the first to the second Richard. During the fifteenth century, that is from Richard II. to Richard III., churches were built chiefly in the style so common in the parish churches of the West of England; more conspicuous for their lofty towers, large windows, and generally fine proportions, than for real freedom of artistic skill. Under the Tudors, that is from Henry VII. to Elizabeth, the degradation of Gothic became complete—coarse, heavy, unmeaning loads of ornament in square panellings took the place of grace and freedom.

Changes of a similar but even more debased character were going on upon the Continent, concurrently with the increasing corruption of the Church.

ITALIAN ART IN THE FOURTEENTH CENTURY.

But amidst this corruption there were noble minds struggling against the evil around them. A deeply Christian spirit was finding its expression in sublime poetry, and finally arose a school of painting so pure, so refined, that, although it has been surpassed in richness of colour and in many technical details, it

* See Ruskin on 'Gothic, and on the Functions of the Workman,' a small book sold for sixpence, which will well repay study.

has hardly ever been equalled in religious expression. In fact it was one of those outpourings of the sanctified imagination of man which occur but once in the same form. The spirit may appear again, but, the outer world being different, the form of the beauty cannot be repeated. The attempt to reproduce such work is childish. We have seen its result in modern times.

It is recorded * of one of these great painters "that he never painted for money; that he might have gained wealth and honour, but, for the peace of his soul," he preferred to be a poor brother, and work for love. "He never began his work without prayer; and so entirely did his subject fill his soul, that he was frequently interrupted by tears when representing the sufferings of the Redeemer. He considered what he had painted as a gift from heaven, and never ventured to improve it." This painter was called the "Blessed Angelic Brother," Beato Fra Angelico da Fiesole.

The glorious subject of the revival of painting in Italy must scarcely be followed another step, for fear it should lead us too far. Suffice it only to say, that the Angelic painter last spoken of was not long afterwards succeeded by the great men with whose names every one is familiar: Leonardo da Vinci, the painter of the Last Supper; Michael Angelo, the painter of the Sistine Chapel; Raffaele, perhaps best known to the ordinary reader by the Transfiguration, or by the Madonna and Infant Saviour. That any or all of these men may have been surpassed in some particular by other artists, that they had their respective frailties of character, is only to say that they were men, and therefore imperfect. But in their greatness of thought, in their power of bursting through the trammels of fashion, of seizing the broad view of human nature, and of embodying the great facts of our redemption for all future ages, they mark a period in the history of the world; and, for good or for evil, according as we use what has been given to us through them, society will be influenced by them as long as the civilization of the world lasts.

The great fact of the revival of Art in the 13th century was simultaneous with the invention of printing and the discovery of gunpowder. Gunpowder,† by destroying the impregnable security of barons' castles, put an end to reckless plunder, and the consequent growth of towns enabled the people to devote themselves to commerce and the arts in comparative security. The effect of printing towards promoting a general spirit of inquiry needs no remark. The discovery of remains of ancient Greek

* This account is taken from a work published by an artist whose name is an honour to Devonshire. 'Handbook of Painting,' by Kugler, edited by Sir C. Eastlake.

† Wornum's 'History of Painting,' p. 166.

and Roman art had, no doubt, some effect in leading the artists to Nature and to graceful execution. But the main cause of their greatness is to be found in the intense intellectual energy of the age of which they were the types,—an activity which produced the Reformation in England and Germany, and consolidated the Papal system in the south with renewed energy. Leonardo and Michael Angelo were architects, sculptors, and poets, as well as painters. Raffaele was especially remarkable for the spirit in which he lived with those around him. It is related that the painters who worked with him lived in perfect harmony, as if all bad feeling were extinguished in his presence, and every base, unworthy thought had passed from their minds; he always had a great number of artists working for him, helping them with the kindness of a father. When he went to court he was followed from his door by perhaps fifty painters, all clever in their way, to whom it was a pleasure to do him honour.*

After these great men came a host of inferior imitators. The world was for a while torn by fierce religious struggles. The times were unfavourable to the efforts of great artists; but it is needless to trace the stages or the decline of the efforts to revive the form after the spirit was lost, and to teach elaborate details of execution, when the real principles of art were perverted.

It must not, however, be omitted that in conjunction with the revival of painting in Italy there arose a corresponding development of Architectural and Decorative Art known by the name of the Renaissance, or New Birth, which to some readers would be better indicated by the term Palladian. The writer cannot profess any very hearty sympathy with it, but it would be a foolish affectation to pass over slightly a school of architecture of which St. Peter's at Rome is one great example, and St. Paul's in London, at a later period, another.

As a school of ornament the Renaissance is even more highly reputed than as an architectural school, owing to its perfectly free imitation of nature. Some samples of this work, or at least copies of it, may be seen in the South Kensington collection, and in Messrs. Elkington's case at the Barnstaple Exhibition.

After the Renaissance (we quote Mr. Wornum's words), "came the final decline, mere love of display, gold, and glitter;" then followed a still worse style made up of incoherent details without meaning, called the Rococo, which may be recognized in certain very inconvenient wardrobes and clumsy fireplaces in our old manor-houses,—the intense ugliness of which passes description: they remain a hideous record of the taste of the Squire Westerns of the last century.

* Vasari, quoted by Kugler.

These monstrosities produced a reaction to the opposite extreme of an affected Grecian purity, from the coldness of which we are now recovering to the free use of colour in ornament.

Of the history of the rise and growth of the modern English school of painting it is impossible here to speak in detail. Suffice it to say, that perhaps the greatest name of the English school, Sir Joshua Reynolds, belongs to Devonshire, as does that of Sir C. Eastlake, the present President of the Royal Academy. It is remarkable also that among professed painters few have equalled, none have surpassed, these two distinguished artists in their contributions to the literature of their art. We shall speak presently of landscape and of that peculiarly English art, water-colour. Its greatest name is Turner; some of whose most remarkable works owe their suggestion to Devonshire scenery.

Before we pass to our own times, let us note some of the lessons to be learnt from this scanty outline of the history of Art.

1. That Art is intimately connected with peace, with national life and energy, with manly literature, and free institutions.

2. That Art, to be great, must be honest; it must rest on Truth and Nature.

3. That nothing great in Art will come of mere imitation of the style of former artists.

4. That mere fashion, or the display of wealth as a motive for the possession of works of art, does not lead to a genuine love of what is beautiful and true. And the artist who panders to such a motive, though he may make his fortune, will be a lost man.

THE CONNEXION OF ART WITH AGRICULTURAL IMPROVEMENT.

And now we must turn from these lofty subjects to the homely topics of our own immediate work in the West of England, in order to show the connexion between that work and the Arts.

For some years past, a number of persons in various occupations and situations in life have taken a warm interest in the improvement of the art of Agriculture.

They have been led to pay great attention to appliances of Mechanics, and some attention to the laws of Vegetable and Animal Life, and to the principles of Chemistry.

These practical subjects have induced a strong sense of the value of general education. We now embark in the improvement of the Arts; or, at any rate, in the improvement of our own power of appreciating the Arts.

What are our qualifications for such a task, and what are our opportunities?

Is it not true that, in the course of our endeavours to understand our own practical art of food-supplying, we have been led

imperceptibly to discover—faintly, it may be, but truly—the beauty, the harmony, the proportion of God's laws in nature?

And do we not also frequently speak of beauty in mechanical contrivances, and in animal forms, in a way which shows that there is something worth caring about beyond the mere question, "Will it pay?"—important as that question is?

The first step in Art, as we have seen, is to produce what is useful; the next is to produce a tool or implement which will do useful work effectually.

But the work, though done, and done well, may be done at too great a cost of human labour, or of money and time. A further step in Art is to bring mind to bear on matter: to accomplish by skill and by science what we used to do only by force. Thus far we deal only with the useful and mechanical arts, such as have already found encouragement in our annual exhibitions.

THE PURPOSES OF DECORATION.

The embellishment of what is useful follows next, but this requires leisure.* A remarkable instance of the connexion between leisure and art may be noticed in the Swiss cottage, where the forced repose of the winter, burying the land for months in snow, leads a hardy and hard-working people to spend much time in the decoration of wood-work by the knife or chisel.

But Decoration implies love and sympathy. In surrounding our English homes with the flower-garden and the shrubbery, in decorating our living-rooms and social tables, we stamp our love on familiar scenes. If this be done in a right and unselfish spirit, we open a door to sympathy by providing for the pleasure of others.

There is thus introduced, at once, a touch of something beyond a mere regard to profit; there is an appeal to the sense of beauty. To be really successful, such Decorations must not minister to self-exaltation or personal vanity. When this taint comes over the mind, farewell to all good taste, whether it be in dress, in furniture, in gardening, or in any other form of Decorative Art.

It has been said that the essence of the Fine Arts begins when the useful ends. This also is true. Beauty and ornament cannot be had for nothing; and yet a tender spirit and a true heart will find time, if not money, to make the little sacrifices which are necessary to lend a charm to life, and to add to the happiness of those who are loved. How many a cottager's wife is a proof of this! The "LAMP OF SACRIFICE" may be kindled from the poor man's fireside.

* Compare the extracts from an American work by Vaux, given in the Notebook, p. 258.

It would be a great mistake to suppose that the Fine Arts do not tend to practical utility in a very real and important sense. Their noblest use is, doubtless, to "purify enjoyment," and to cull from Nature noble suggestions as types of a higher state of things.

But, in a lower sense also, the Fine Arts prove their utility. In proportion as they are cultivated by a nation in a right spirit, the taste developed by the higher artist gradually influences various kinds of manufactures; and, in certain states of the world, taste is so intimately connected with manufacturing prosperity, that a nation which neglects the cultivation of taste runs a serious risk of being beaten in the race of competition.*

THE CONNECTION BETWEEN THE USEFUL AND THE FINE ARTS.

We thus arrive at the close relation subsisting between the Fine Arts and the Decorative and Useful Arts.

The Useful in the present state of society cannot be separated from the Decorative; and the Decorative derive their guiding principles from a prevailing taste in the Fine Arts.

In the first place, the workman who has not in some degree the feeling of an artist will not be a good decorator. But, in the second place, what is still more important, wealthy employers, if they are insensible to the higher notes and harmonies of the Fine Arts, will be so entirely devoted to their own personal comfort on the one hand, or to a love of vulgar display on the other, that the artist workman will find no encouragement.

THE NATURE OF THE WEST OF ENGLAND EXHIBITION.

The Exhibition at Barnstaple contains a collection of Decorative Art in the form of pottery, china, glass, metal-work, and wood-work; but it would be incomplete if it did not also contain an exhibition of the Fine Arts.

It has been thought well, however, to begin on a small scale, and to give a decided preference to one branch of Art which is peculiarly English, and which has been cultivated with remarkable success in the West of England, namely, Water-colour Drawing.

For this selection there are several reasons. The mechanical arrangements are more easily made; frames can be to a great extent dispensed with, whereby much expense is saved to the artist and to the Society, and much risk of damage and annoyance avoided. Water-colour art, even of moderate excellence, is

* See extract from Mr. Wornum's *Analysis of Ornament*, appended to Dr. Scott's paper above, p. 224.

very popular, and much more generally intelligible and interesting than what is attainable by a parallel amount of talent and industry in oils.

LANDSCAPE.

Although the Exhibition will probably contain some choice specimens of figure-drawing, the following remarks will relate chiefly to Landscape.

Devonshire men hardly need to be told that whether on "the heath-clad hill," along the "winding shore," or in the "deepening glen,"—

"The Landscape in its glory
Teaches truth to wandering men ;"

but a few remarks on the object of the Landscape-painter, the resources at his command, the conditions under which he is compelled to work, may perhaps be acceptable to the younger readers of the Journal.

Few persons are aware how little they see of Nature's charms until their eyes are opened, either by close examination of the works of great artists or by laborious and careful study of Nature itself. Unfortunately, Fashion has so great a tendency to warp the judgment, that, of those who are fond of pictures, too many follow the stream in admiring a particular artist, perhaps for his very untruthfulness glossed over by some peculiar trick of execution, till, having set up their idol, they only see Nature through the medium of his contracted vision. The office of the great artist is to teach us to love Nature, and to admire the beauties which our Creator has showered over his works with no sparing hand.

Persons who are engaged in agricultural pursuits may be especially thankful for this help to sympathy with Nature ; they wage a constant conflict with the material world, endeavouring to subdue it to the purpose of their own profit. It is well for them to be reminded that the clouds and the sunshine have other purposes besides the watering of their crops and the ripening of their grain, and that some of the "pests of the farm" are also "lovely flowers ;"—while to the citizen in the town it is a great refreshment to have a vivid representation of country scenes and green fields brought into his home. The great market of the Landscape-painter is said to be among the opulent inhabitants of manufacturing towns.

SELECTION OF BEAUTIFUL OBJECTS.

The first and most essential aid which the artist renders to the common observer is the selection of subjects suited for permanent contemplation.

It is sometimes said that all Nature is beautiful, that the difference is only in our way of looking at it. This may well be doubted. Certain it is that the great artist helps the ordinary spectator to select those objects which are most capable of making a deep impression on the mind, when represented in pictures.

The power of the painter to give either pleasure or instruction through his Art is much affected by the imperfect and limited nature of the human faculties, but it also appears to be connected with certain longings implanted in the human mind for a better state of being: with the sense of disappointment in earthly things, and with the craving after unity, order, and harmony. The whole creation is said to groan and travail, and it finds its response in the human heart and imagination.

The painter's power is also subject to conditions resulting from the limited power of vision in the human eye, from the flat surface on which the objects are represented, and from the nature of the materials at his command.

From these two considerations certain principles appear to follow.

In order to satisfy the longings of the mind, the painter must subordinate a variety of objects to some law of unity, and that law of unity must be governed by the prevailing impression which he desires to convey. These may be called the poetical principles, the motives, the "expression" of Art.

The nature of the human eye and of the materials by which the painter works, oblige him to express his loftiest thoughts by certain means and contrivances, among which are to be found the technical rules of Art: rules which, in the hand of the real artist, are founded in common sense and experience; and which, in the mouth of the critic, are apt to run into unmeaning cant and superficial theory.

Commencing then with the poetical principles, or laws of expression. The first requisite for a picture which is to produce an impression is,—

1. That it should have a *prevailing tone or purpose*: mere imitation of an object, however close, is not enough; and, in fact, mere imitation without a purpose of expression is certain to fail even of its own object, viz., simple copying. The painter must have a story to tell, and he must make up his mind to tell one story at a time. If he has nothing in him he will give out nothing, however clear his eye or clever his hand. Therefore all good Art is connected with the tone of the artist's mind: if the fountain be impure, the stream will not be clear.

"No branch of Art Economy is more important than making the intellect at your disposal pure as well as powerful, so that it may always gather for

you the sweetest and fairest things. The same quantity of labour from the same man's hand will, according as you have trained him, produce a lovely and useful work, or a base and hurtful one; . . . its chief value depends upon its being able to exalt and refine, as well as to please, and the picture which most truly deserves the name of an Art Treasure is that which has been painted by a good man.”*

Speaking only of Landscape Art, among the ordinary impressions which the artist may aim at conveying are such as these:—a sublime sense of power in Nature, as in a storm at sea, or a deep sense of sympathy with a ship in danger; the vastness of the solitude of mountains; the peaceful extent and expanse of fruitful plains; the bustle of the busy market-place, the repose of the cottage; the innocent play of children, or their intense delight in animal life.

Take, as an example of the purpose of a picture, in a somewhat deeper tone of human interest, the following description of poor Margaret's Cottage, in Wordsworth's 'Excursion':—

“She seemed the same
In person and appearance, but her house
Bespake a sleepy hand of negligence.
The floor was neither dry nor neat; the hearth
Was comfortless; and her *small lot of books*—
Which in the cottage-window *heretofore*
Had been piled up against the corner panes
In seemly order—now, with straggling leaves,
Lay scattered here and there, open or shut
As they had chanced to fall.
I turned towards the garden-gate, and saw
More plainly still that poverty and grief
Were now come nearer to her: weeds defaced
The hardened soil, and knots of *withered grass*;
No ridges there appeared of clear black mould;
No winter greenness—of her herbs and flowers
It seemed the better part were gnawed away
Or trampled into earth; a *chain of straw*
Which had been twined about the slender stem
Of a young apple-tree, lay at its root—
The rest was nibbled round by truant sheep.”

2. In order that the artist may tell his story clearly, the subject must be so *selected and arranged as to give an impression of one complete whole*, of which all the parts are so connected together that nothing shall be excessive or distracting from the main purpose; and, on the other hand, nothing shall be felt to be incomplete or wanting. The following extracts from Mr. Ruskin's 'Elements of Drawing' put forcibly what is here intended:—

“In a great picture, every line and colour is so arranged as to advantage the rest. None are inessential, however slight; and none are independent, however forcible. *It is not enough that they truly represent natural objects; but*

* Ruskin's 'Political Economy of Art,' p. 41.

they must fit into certain places, and gather into certain harmonious groups: so that, for instance, the red chimney of a cottage is not merely set in its place as a chimney, but that it may affect, in a certain way pleasurable to the eye, the pieces of green or blue in other parts of the picture.

"Another important means of expressing unity is to mark some kind of sympathy among the different objects; and perhaps the pleasantest, because most surprising kind of sympathy, is when one group imitates or repeats another, not in the way of balance or symmetry, but subordinately, like a far-away and broken echo of it. Prout has insisted much on this law in all his writings on composition; and I think it is even more authoritatively present in the minds of most great composers than the law of principality. It is quite curious to see the pains that Turner sometimes takes to echo an important passage of colour. In the Pembroke Castle, for instance, there are two fishing-boats, one with a red, the other with a white sail; in a line with them on the beach are two fish in precisely the same relative positions, one red and one white.

"Another important and pleasurable way of expressing unity is by giving some orderly succession to a number of objects more or less similar; and this succession is most interesting when it is connected with some gradual change in the aspect or character of the objects. Thus the succession of the pillars of a cathedral aisle is most interesting when they retire in perspective, becoming more and more obscure in distance; so the succession of mountain promontories, one behind another, on the flanks of a valley; so the succession of clouds, fading farther and farther towards the horizon, each promontory and each cloud being of different shape, yet all evidently following in a calm and appointed order. If there be no change in the shape or size of the objects, there is no continuity; there is only repetition—monotony."*

3. *The details should every one be pleasing.* No part of a picture should be dull or repulsive, yet no subordinate part should be so important as to divert attention from the general effect.

What Coleridge says of Poetry, is equally true of Landscape Art. All the parts "must be such as to justify the perpetual and distinct attention to each part. . . . A poem is discriminated from all other species of [literary] composition by proposing to itself such delight from the *whole*, as is compatible with a distinct gratification from each component *part*."†

These general principles, more or less pervading all great works of Art, are founded in human nature, to which the artist appeals for sympathy. When worthily acted upon, they tend to feed the craving of the mind for pleasing thoughts, for harmony, and for unity; of which every lover of Art is more or less conscious.

In the mind of the Artist there must be principles not less important, without which he cannot supply the expectation which

* 'Elements of Drawing,' by John Ruskin, M.A.

† Coleridge's 'Biographia Literaria,' chap. xiv.

he awakens,—namely, an intense love of Truth, and a governing law of Self-Control.

LOVE OF TRUTH NECESSARY TO THE ARTIST.

One reason why Art is not more generally appreciated is, because Artists have too often been the slaves of a narrow fashion or conventionality; reproducing the mere tricks of their predecessors, regardless of Truth. The plain common sense of mankind revolts at falsehood in an art which professes to hold up the mirror to Nature. In the present day, Natural Science has sharpened the eyes of educated men to the facts of Nature. Pictures of clouds, of trees, and of rocks,—which used to pass for the grand style, or for the ideal of Nature, in the Academies of Artists,—are now rejected simply because they are seen to be untrue, and are felt to be less beautiful than the clouds, trees, and rocks, as they exist in fact.

This feeling, long lurking in men's minds, in spite of connoisseurs and picture-dealers, found indignant expression in the first volume of John Ruskin's '*Modern Painters*;' a work which, in spite of its somewhat paradoxical tone, has been justified by the more careful and truthful practice of the greatest Artists of our own time, and by a more widely-diffused love of Landscape Art, consequent on the production of more truthful, but not less beautiful works. The intense love of Truth, when it actuates the Artist, will lead him to diligent study of detail in form and colour. But here arises the necessity for self-control.

SELF-CONTROL IN THE ARTIST.

From the natural tendency of mankind to run into extremes, artists are not more free than others. Young artists especially are tempted to any kind of excess which will arrest attention. A school has arisen among us which has certainly the merit of wonderful labour, but which has carried the principle of elaborate painting of details to excess. Some of the members of this school, observing and imitating the care with which the hems of garments and minute ornaments were painted before the days of Raphael, have assumed the name of pre-Raphaelites—as if they would blot out the memory of all the decay of art since the days of the great master, and take it up where he found it. In pictures of this school, you will often see a foxglove painted with such elaborate distinctness, that it catches the eye too forcibly for you to see anything else without an effort. If the purpose of the picture is to tell the tale of the foxglove, this may be right; but, if the picture has any higher purpose, the foxglove would do well to

imitate the modesty of its violet or lily sister, and retire into the shade.

Sir C. Eastlake has shown, in a most masterly paper,* why in statues, if the imitation of a button or a sword be carried to perfection, the expression of the face will be destroyed. Minor details therefore must be, if the phrase may be allowed, "under-done," if the most important expression is to be rendered with any effect. This principle explains why, in all branches of art, some portions of the execution must be kept down: not that anything is to be slurred over or neglected, but the artist must exercise great care and most deliberate self-control in doing enough to each part in due proportion, and not doing too much. In all good work there must be not only intense and vivid reality—there must also be selection, and selection implies rejection. This doctrine, I am afraid, is flat heresy in the eyes of some of our zealous young friends: all honour to their zeal and truthful labour! the fruit will be all the more perfect when it is ripe.

THE MECHANISM OF ART.

The mechanical aids by which the painter expresses truth are three—lines, shadows, colours. As the object of this paper is not to teach young persons how to learn drawing, but rather to call attention to the work of the artist, suffice it to say, that we only know and judge of form by the degrees of light and shadow. Let any one put down an egg on a piece of paper—first with one candle, then between two candles—and ask himself how he makes out the shape of the egg. Better still, let him take up a piece of charcoal or soft pencil and try to rub on another piece of paper the shadows he sees; he will be surprised to see how he will find out delicate half-shadows, and especially the *reflected lights inside the shaded parts*, by which the round form of the egg is revealed to the eye. Of these and the like facts the artist must be absolute master, and the mastery can only be acquired by a life of labour, though of course much depends on the natural gift of the eye. But, in looking at pictures, it will be observed that some men are much more precise in their delineation of form than others. It is a great mistake to take neatness and precision of form as the standard of excellence: in fact, as a general rule, it would be safer to say that a neatly outlined form is a sign of something wrong. Superficial neatness of unmeaning touch is the fault into which artists are apt to fall if they are much occupied as teachers. Success as a drawing-master is very dangerous to an artist; for, unfortunately, this neatness of touch and facility of execution are

* 'Contributions to Literature of the Fine Arts,' pp. 72, 73.

what the pupils and their friends admire and judge him by. It must be borne in mind that in Nature there is no such thing as outline.

OUTLINE.

Notwithstanding, the first attention of the artist and of the pupil must be given to *Lines*. Lines are among the most delicate means of expressing a refined sense of beauty, such as the form of a mountain or of a tree. Lines are essential to define objects with the necessary distinctness; they lie also at the very foundation of all composition by which the eye is conducted from various parts of the picture, gliding down the sky, swimming over the water, or flitting bird-like, "down-over," as we say in Devonshire, and "out-round" the hill and the combe, and lighting on the culminating point of interest, be it a village church in the vale or a striking mountain-top.

SHADOW.

Of *Shadow*, it need not be repeated in any detail that it defines form: much of the force of particular points of interest depends on a deep shade, well placed; but one great purpose of shadow is to give unity to the whole scene—what artists call "breadth." Shadow also, by contrast, gives the whole of their brilliancy to the light portions, for which it must be remembered that the artist has no resources but white paper or white paint, which of course are both far below the brightness of the sun, or of its reflections.

Without entering into any of the technicalities of light and shade, it will be an interesting occupation for the amateur to trace in a picture which pleases him the unity and connecting links of light. A bright light in the sky will be, perhaps, led along a mountain-top, caught up by a village spire, reflected in the pool below, carried away like a flash of lightning by the bright tip of the horn of a cow, and so conducted along a sunny bank out of one corner of the drawing, and, perhaps, there will not be a single bright spot which may not be linked with the main brightness of the parts.

Artist is *Colour*.
 of the Creator
 were utility. It
 to keep up
 shadow

the glory of Heaven. The late Mr. Wilberforce is said to have noticed this fact, and to have added, in his playful way, "What a mercy it was that the Almighty had not given over the Creation of the World to the Quakers, as then we might have had a drab-coloured World!" Colour in the hand of the Artist is the source of the most intense pleasure to the beholder. It is a very remarkable fact, worked out by Mr. Gladstone in his exhaustive way, that Homer and, by inference, his contemporaries were almost entirely destitute of the perception of the beauty of colour. The power of colour, however, was well-known and most skilfully used by the great painters of Italy, long before its theory was in any degree explained. It is now known that the light of the sun may be divided into rays of blue, red, and yellow; that their various combinations take place in certain proportions; and that harmonious colouring is intimately connected with these proportions. These laws have been set forth, like most other new discoveries, in the form of technical rules with much array of system.

Mr. Ruskin, who delights in striking confusion into the ranks of the learned Philistines, especially if he can bring the jawbone of a good paradox to his aid, says, "If any scientific person tells you that two colours are discordant, make a note of the two colours and put them together whenever you can:" a dictum which he proceeds to illustrate by the case of the blue and green, which Nature so beautifully combines, in spite of rule. It is quite true that theory will never make a man a colourist, if he has no eye for colour; it may be also true that much nonsense has been written and spoken about discords and concords in colours. But, for all this, there are laws of colour; and these laws cannot be broken without producing a sense of harshness, or dullness, or confusion, or some other painful sensation.

It is without doubt true, for example, in painting, that the effect of each little spot of colour in a drawing is affected by other colours: brilliancy of colour, in fact, depends less on the actual pigment employed than on judicious contrast, harmony, or well-poised balance, continuity, repetition, and many other delicate laws too subtle for expression.

The broad fact remains, that, apart from truth of imitation, the general turn, contrast, and harmony of colours in a drawing furnish a distinct source of pleasure and interest; and this is so true, that a person who is fond of pictures, and whose powers of vision are somewhat indistinct, can pick out in a moment, with a glance, a pleasing drawing—before he sees it close enough to distinguish what it represents, or to make out a single form. It will also be generally found, that works which give this kind of

pleasure are more or less to be explained with reference to the general laws of colour above referred to. Few persons derive much pleasure from pictures in which cold or raw greens preponderate; on the other hand, warmth of colour resulting from rich yellows, reds, or browns, supported by a due proportion of blues and purples, will be found to characterize many of the works on which the eyes rest with the most abiding pleasure.

Manufacturers of objects of decoration—such as carpets, paper, and woven hangings—have found out the importance of attending to the laws of Colour, and they have a deep interest in disseminating a knowledge of the subject among their customers. One of the objects of our Water-Colour Exhibition is to call attention to the subject of Colour.

CONTRAST AND COMBINATION.

In the fulfilment of his high purpose, and in the use of the means at his command, the artist must, like the practical man in every other art,—like the farmer, the mechanic, the medical man, and the poet,—gather up the experience of former ages into rules of practice. His success will depend—partly on the depth to which he has fathomed the reason of the rule and gained the power to break through all rule on fitting occasion—partly on the skill acquired by diligent efforts of his own to master difficulties, and not to fall into the beaten track where effort degenerates into habit.

Among the laws or rules which have been set forth with so much fullness of detail and illustration, two may be especially noticed for our present purpose,—*Contrast and Combination*.

Contrast.—First, let us revert to what has been already said on the subject of unity. From the first guiding principle of unity results one of the most familiar rules—that a drawing must not be cut in half by an unbroken line, whether horizontal or perpendicular. Horizontal and perpendicular lines are of the utmost importance, but they must be intersected or turned aside, so as to serve their purpose, without tearing the drawing into two parts. In like manner, from the same law of unity, follows the necessity for convergence and radiation of lines and of shadows.

These and the like points being borne in mind, the *Laws of Contrast and Combination* will not be misunderstood. It will be found that clearness and force depend on *Contrast* of lines,—straight with curved, concave with convex, rectangular with diagonal. In like manner, the infinite play of light and shade

depends on contrast of various degrees of strength ; so also every colour derives its force from its opponent. But one form which contrast must take is the apparently opposite form of balance : only here again the danger of upsetting the unity of the work warns us against a balance which is only the repetition of identical objects ; there must not be two trees, on opposite sides, equal and similar in shape, nor must two sides of a house or two sides of a river be shown at an equal angle ; objects of equal value may balance each other, but there must be contrast in the balance,—it must be the equipoise of the steelyard, in which the length of the lever balances the greater weight, not the identity of bulk in equal scales.

“The character of everything is best manifested by *Contrast*. Rest can only be enjoyed after labour ; sound, to be heard clearly, must rise out of silence ; light is exhibited by darkness, darkness by light, and so on in all things. Now in Art every colour has an opponent colour, which, if brought near it, will relieve it more completely than any other : so, also, every form and line may be made more striking to the eye by an opponent form or line near them ; a curved line is set off by a straight one, a massy form by a slight one, and so on ; and in all good work nearly double the value is given to each by contrast. But a too manifest use of the artifice vulgarises a picture : great painters do not commonly admit violent contrast, they introduce it by stealth and with intermediate links of tender change, allowing the opposition to tell on the mind as a surprise but not as a shock.”*

Under the head of *Combination*, it is intended to include various practical arrangements by which the artist reconciles a playful variety with a pervading unity : it may be by the repetition of the same form vanishing away,—as beautifully pointed out by Mr. Ruskin, in the case of the pillars of the cathedral seen in perspective, the two sides at different angles,—or in wave behind wave, receding from the view on the sea-shore ; or in the gentle perspective retirement of trees along a plain, by which a vast sense of distance is given. How expressive is the image conveyed in the words of the most picturesque of modern preachers,† showing the force both of Contrast and Combination !—

“Those of us who have travelled in mountain countries know how one range of hill rises behind another : one ever seems the highest to be, yet a higher appears behind it ; *each has its own beauty, its own peculiarity*. . . . High above all the rest we see the white peaks standing out in the blue sky,

* This paragraph is quoted from Ruskin's ‘Elements of Drawing.’

† Rev. Arthur P. Stanley, ‘Canterbury Sermons.’

catching the first rays of the rising sun, and the last rays of the sun as it departs. . . . They give a grace, a meaning, a dignity, to all the rest of the earth over which they brood. . . . Above all earthly shadows, above the *countersecting* ranges of earthly differences, are seen the everlasting lights beyond—'The Ancient of Days whose garment is white as snow,' and 'the great multitude clothed with white robes with palms in their hands.'"

After such glowing images from Nature, it is hard to return to the details of Art. Let what remained to be said wait for a more fitting time.

If anything here written, too hastily, alas! shall help the sons and daughters of the West to find more pleasure in the simple love of nature, or to appreciate the work of the truth-loving artist; it may be that the painter shall ere long be a more welcome guest in the farm-house; and that, while he ministers to the enjoyment of others, his daily toil will be cheered by encouragement in the path of Truth, in which alone he finds his own joy.

In other words, I venture to utter the hope that Art is about to take its place as a humanizing element in the education of the Middle Classes; and that every year will show more plainly that the Arts are neither a mere luxury reserved for the wealthy nor an accomplishment intended to minister to personal vanity, but are among the means given to us to call forth admiration of what is good and pure.

In conclusion, the following passages, from the pen of our great Poet of Ottery, may serve to gather up the whole subject, and to show the intimate connexion between Art and Literature:—

"Something analogous to the materials and structure of modern poetry I seem to have noticed in our common landscape-painters. Their foregrounds and intermediate distances are comparatively unattractive; while the main interest of the landscape is thrown into the background, where mountains and torrents and castles forbid the eye to proceed, and nothing tempts it to trace its way back again." &c.

"The two cardinal points of poetry—the power of exciting the sympathy of the reader by a faithful adherence to the truth of nature, and the power of giving the interest of novelty by the modifying colours of imagination; the sudden charm which accidents of light and shade, which moonlight or sunset diffused over a known and familiar landscape, appeared to represent the practicability of combining both; these are the Poetry of Nature.

"The Poet, described in *ideal* perfection, brings the whole soul of man into activity, with the subordination of its faculties to each other, according to their relative worth and dignity. He diffuses a tone and spirit of unity, that blends and (as it were) *fuses* each into each, by that magical power to which we have exclusively appropriated the name of Imagination. This power—first put in action by the will and understanding, and retained under their irremissive, though gentle and unnoticed, control—reveals itself in the balance or reconciliation of opposite or discordant qualities: of sameness, with

difference; of the general, with the concrete; the idea with the image; the individual with the representative; the sense of novelty and freshness, with old and familiar objects; . . . and, while it blends and harmonises the natural and the artificial, still subordinates Art to Nature." *

May we not say of Painting, as of Poetry,—

"GOOD SENSE is the BODY of poetic genius, FANCY its DRAPERY, MOTION its LIFE, and IMAGINATION the SOUL that is everywhere and in each, and forms all into one graceful and intelligent Whole." *

POSTSCRIPT.

Mr. Ruskin's 'Two Paths' reached me, in the midst of pressing engagements, the very day after I had sent off the foregoing paper to the printer. After such hasty perusal as time has permitted, I think I may feel confident that nothing which has been said above is essentially at variance with the principles so earnestly set forth by Mr. Ruskin, in a volume which gives increasing proof, if proof were needed, of his own love of Truth.

I extract a few passages which explain, much better than I have done, what Art is, and on what good Art depends.

The principle which seems to run through the book is, that there is no real improvement to be looked for in Decoration, except from the study of the living form,—whether of the human figure, or of animal or vegetable nature. Thus does Mr. Ruskin, after a quarter of a century of devoted labour, find himself in harmony with the truly great workers and teachers in Art who have gone before him, and yet, in the best sense, consistent with himself. "Fine Art," as he truly says, "remains what it was two thousand years ago, in the days of Phidias: two thousand years hence it will be, in all its principles, and in all its great effects, just the same."

MEANING OF TERMS, MANUFACTURE—ART— FINE ART.

"It would be well if all students would keep clearly in their mind the real distinction between these words which we use so often, 'Manufacture,' 'Art,' and 'Fine Art.'"

"'MANUFACTURE' is, according to the etymology and right use of the word, 'the making of anything by hands,'—directly or

* Coleridge's 'Biographia Literaria,' chap. xiv.

indirectly, with or without the help of instruments or machines. Anything proceeding from the hands of man is manufacture; but it must have proceeded from his hands only, acting mechanically, and uninfluenced at the moment by direct intelligence.

"Then, secondly, ART is the operation of the hand and the intelligence of man together : there is an art of making machinery; there is an art of building ships; an art of making carriages; and so on. All these—properly called Arts, but not Fine Arts—are pursuits in which the hand of man and his head go together, working at the same instant.

"Then, FINE ART is that in which the hand, the head, and the heart of man go together."—(p. 57.)

GOOD ART IS NOT MERELY IMITATIVE.

"Good Art rarely imitates ; it usually only describes or explains. But good Art always consists of two things :—First, the observation of fact ; secondly, the manifesting of human design and authority in the way that fact is told. Great and good Art must unite the two."—(p. 18.)

DESIGN IMPLIES SELECTION.

The first principle of all good Art having been shown to be Love of Nature, Mr. Ruskin adds that the second must be Design.—(p. 43.)

"A looking-glass does not design : it receives and communicates indiscriminately all that passes before it. A painter designs when he chooses some things, refuses others, and arranges all."—(p. 43).

THE TWO PRINCIPLES OF GREAT ART.

"Remember always you have two characters in which all greatness of Art consists. First, the earnest and intense seizing of natural facts ; then the ordering those facts by strength of human intellect, so as to make them, for all who look upon them, to the utmost serviceable, memorable, and beautiful. And thus great Art is nothing else than the type of strong and noble life : for, as the ignoble person, in his dealings with all that occurs in the world about him, first sees nothing clearly, looks nothing fairly in the face, and then allows himself to be swept away by the trampling torrent and unescapable force of the things that he would not foresee, and could not understand ; so the noble person looking the facts of the world full in the face, and fathoming them with deep faculty, then deals with them in unalarmed in-

telligence and unhurried strength, and becomes, with his human intellect and will, no unconscious nor insignificant agent in consummating their good and restraining their evil.

“ Thus, in human life, you have the two fields of rightful toil for ever distinguished, yet for ever associated ; Truth first—Plan, or Design, founded thereon : so in Art, you have the same two fields for ever distinguished, for ever associated ; Truth first—Plan, or Design, founded thereon.”—(p. 46.)

THREE GREAT SCHOOLS OF ART.

“ There have only yet appeared in the world three Schools of perfect Art—schools, that is to say, which did their work as well as it seems possible to do it. These are the Athenian, Florentine, and Venetian. 1st. The Athenian proposed to itself the perfect representation of the form of the human body. . . . 2ndly. The Florentine School proposed to itself the perfect expression of human emotion, and the showing of the effects of passion in the human face and gesture. . . . 3rdly. The Venetian School proposed to itself the representation of the effect of colour and shade on all things ; chiefly on the human form.”—(p. 19.)

Mr. Ruskin also distinguishes three great Periods of noble conventional Decoration—the Greek, the Early Gothic, and the Italian.—(p. 80.)

In these divisions there is nothing inconsistent with what I have stated. The Athenian School corresponds with the Greek, the Florentine and the Venetian are two branches of what I have named as Italian. Certainly I ought to have ranged Titian with the three great men to whom I referred, who are also selected by Mr. Ruskin (p. 29) as the types of the Florentine School ; but my object was purely elementary and general, with a view to readers to whom the whole subject might be new.

DESIGNERS CANNOT BE MANUFACTURED, ANY MORE THAN WHEAT CAN BE MANUFACTURED.

“ If designing could be taught, all the world would learn. . . . My men continually come to me, in my drawing-class—‘ Please, Sir, show us how to design.’ . . . Alas ! I could as soon tell you how to make or manufacture an ear of wheat, as to make a good Artist of any kind. I can analyse the wheat very learnedly for you ; tell you there is starch in it, and carbon, and silex. I can give you starch, and charcoal, and flint ; but you are as far from your ear of wheat as you were before. All that can possibly be done for any one who wants ears of wheat is to show them

where to find grains of wheat, and how to sow them; and then with patience, in Heaven's time, the ears will come—or will perhaps come—ground and weather permitting. So, in this matter of making Artists: first, you must find your Artist in the grain, then you must plant him, fence and weed the field about him; and, with patience, ground and weather permitting, you may get an Artist out of him—not otherwise. And what I have to speak to you about to-night is mainly the ground and the weather, it being the first and quite most material question in this matter, whether . . . the ground and weather of England in general suit wheat.”—(p. 115.)

The Note-Book.

NOTES FROM OLD BOOKS, &c.

1.—*Palissy, the Potter.* Contributed by R. W. BLENCOWE, Esq.,
The Hooke, Lewes, Sussex.

IN our search after those who in former days have written down their thoughts and the results of their experience upon subjects connected with agriculture, it is impossible to pass over one of the most remarkable men of his own or indeed of any age—Bernard Palissy, the potter. It would be foreign to our purpose to speak at length of those extraordinary works of his in pottery, in which, with that truthfulness which was a remarkable feature in his moral character, he imitated to the life those objects of nature which it was his great delight to observe: snakes and lizards, lobsters and shell-fish, fishes, seaweed, ferns, and creeping things innumerable, which when sold in the present day command such high prices as place them only in the collections of the rich. Neither shall we dilate upon his piety, his resolution, his bold defiance of every danger in seeking after and adhering to religious truth, which in the time of the persecution of the Huguenots would have brought him to the stake, if his great artistic skill, which made him almost a necessity to his great and powerful employers, had not saved him from that fate; and this failed at last to preserve him from that imprisonment in the Bastille where he passed the last four years of a glorious life.

It is our business to consider him in the character of a geologist and a thorough lover of agriculture. Born in the condition of a peasant in the very early part of the 16th century, in an obscure provincial town in the South of France, he wandered about among the plains and rocks and woods in the neighbourhood of his native place, and employed his eyes to observe, as our own Hugh Miller—a kindred spirit to his own—in our own day has done; and he directed his naturally sagacious mind to reflect upon what he saw, and thus he was enabled to pry into many of the secrets of nature, and to anticipate many of the discoveries of later times, which he announced to the world, and was laughed at as a dreamer of idle dreams.

To those who little value the efforts now made to instruct the farmer and the husbandman in the principles of the noble science in which they are engaged, we would commend to their notice the following passage in his work, published about

the middle of the 16th century, entitled, 'How to grow Rich in Farming.' It is carried on in the way of dialogue, and, to a fancied objector to his theories, he says :—

"I see so much error and ignorance in all the arts, that it seems to me as if all order were for the greater part perverted, and that each labours on the soil without any philosophy, and that all jog onwards . . . at the accustomed trot, following the footsteps of their predecessors, without considering the nature or the prime causes of agriculture. . . . There is no art in the world in which a greater philosophy is required than agriculture; and when agriculture is conducted without philosophy it is the same thing as a daily violation of the earth and of the things which she produces. . . . I dare well affirm too that, if the earth were cultivated as it ought to be, one day would produce the fruit which two give in the way that it is now cultivated daily. . . . When you walk through the villages, consider a little the muck-heaps of the labourers [the word labourer is not used by him in the same sense as it is at present, but means a husbandman generally], and you will see that they put them outside their stables, now on a high place, now on a low place, without any consideration, but, if the heap be piled up, it suffices them; and then take notice in a time of rain, and you will see that the waters which fall on the said muck-heaps carry away a black tint in passing through them, which is the chief part and whole sum of the substance of the muck-heap. . . . Do you not see, then, a manifest ignorance which is greatly to be regretted. . . . Note," he says, "that there is no produce of the soil, whether good or bad, that does not contain in itself some kind of salt; and when the straw, the hay, and other herbs are putrefied, the waters which pass through them carry away the salt which was within them; and just as you see that a salt had-dock would at last lose all its salsitive substance, and at length have no taste at all,—in like manner you must believe that the muck-heaps lose their salt when they are washed by the rains."

To the question, How can I keep my manure from spoiling? his directions are as clear and sensible as any of the receipts published in our agricultural journals at the present day, and, in fact, he has anticipated several of them.

"If you wish," he says, "to have the full and complete service of your manure, you must hollow a pit in some convenient place near to your stables, and this pit having been dug in the shape of a pool or of a watering-pond, it is necessary that you pave it with flints, or stones, or brick, and this having been well plastered with mortar made of lime and sand, you will take your manure there, to be kept until it be necessary to take it to the fields. And in order that the said manure be not spoilt by the rains nor by the sun, you will make some kind of hut to cover it, and when the seedtime shall arrive you will carry it into the field, with all its substance, and you will find that the pavement of the pit will have preserved all the liquid part of the manure, which otherwise would have been lost, and the earth would have absorbed part of the substance of it. . . . I assure you that it is the best of the manure, because containing the most salt; and if you thus will render back to the earth the same thing which had been taken from it by the growth of seeds, the seed which you put into the ground afterwards will take up again the same thing that you will have carried thither."

How would he have rejoiced in our noble institution, a show-yard of implements!

"I could wish," he exclaims, "that the king had founded certain offices,

estates, and honours for all those who should invent some good and subtle agricultural tool. If it were so, everybody's mind would have been bent on achieving something. Ingenious men were never in demand at the siege of a town, but there were found a few ; and precisely as you see men despise the ancient modes of dress, they would despise also the ancient implements of agriculture, and in good sooth they would invent better ones.

"Armourers often change the fashion of the halberds, swords, and other harness, but the ignorance in agriculture is so great that it abides ever accustomed to one method, and if the tools were clumsy at their first invention, they preserve them ever in their clumsiness : in one province, one accustomed fashion without any change ; in another province, another also without ever changing.

"It is not long since I was in the province of Bearn and of Bigorre, but in passing through the fields I could not look at the labourers without chafing within myself, seeing the clumsiness of their implements. And why is it that we find no well-born youth who studies as much to invent tools useful to his labourers as he takes pains over the cutting of his coat into surprising patterns ? I cannot contain myself to talk over these things, considering the folly and ignorance of men."

He thoroughly comprehended, when no one else did, the true theory of rain :—

"You must believe firmly," he says, "that all the waters that are, shall be, and have been, were created in the beginning of the world ; and God, wishing to leave nothing in idleness, commands them to go to and fro, and be productive. This they do without ceasing, and in like manner the rain-water that falls in winter remounts in summer to return again in winter. The heating of the sun and the dryness of the winds striking against the earth raises a large quantity of water, which being collected in the air, and formed into clouds, are sent out to all the corners of heaven, as the heralds of the Lord ; and when it is God's pleasure that the clouds, which are nothing more than stores of water, shall dissolve, the said vapours are converted into rains which fall upon the earth."

Nor has the theory of springs of water ever been more clearly and simply demonstrated than in the following passage :—

"Having taken this into your consideration,"—he had been speaking of the hardness of rocks,—“and into your memory, you can understand the reason why more springs and rivers proceed from the mountains than from the remainder of the earth, which is no other thing than that the rocks and mountains retain the water from the rains, as they might be held in a brazen vessel. And the waters falling over the earths and clefts always descend, and are not stopped until they have found some spot grounded with stone or rock condensed, and then they rest upon that bottom ; till having found some channel or other opening, they press out in fountains, brooks, or rivers."

It is said that Artesian wells were first bored in Artois long before the time of Palissy, whilst others dispute the fact. Certain, however, it is, from the following passage in his Treatise upon Marl, that he had fully ascertained the true principle of them :—

"I think," he says, "the soil might be pierced easily by rods, and by such means one might easily discover marl, and even well waters, which might often rise above the spot at which the point of the augur found them ; and that could take place provided they came from a place higher than the bottom of the hole that you had made."

These are some of the discoveries of a man made 300 years ago, and who, as he says of himself, "had no other book than the heavens and the earth, which are known of all men, and given to all men to be known and read." *

2.—*The Western Counties.* By R. W. BLENCOWE, Esq.

In the last volume of this Journal we gave as a proof of the great wealth and importance of the county of Somerset in early times, the fact, that when a tax under the name of a benevolence was levied in 1547 on all the counties of England, the highest sum, amounting to 7000*l.*, was paid by that county; then came Kent and Essex, and Devonshire ranked as the fourth in the amount of its contribution. We have another curious proof leading to the same conclusion, which occurred a hundred years later. Some of our readers may not be aware that about the middle of the seventeenth century it was a common custom in towns where any number of workmen were employed in manufactories, to coin and issue a low denomination of copper money—pennies, halfpennies, and farthings—for the payment of the workmen and the poor; and these were called Town Tokens. At the time we speak of, between the years 1648 and 1672, there were 87 towns in England where the tokens were coined. It is a remarkable proof of the activity of trade in the county of Somerset, that there were no less than 13 towns within it which issued this currency; the next largest number was in Dorsetshire, where there were 8; then came Devonshire, where there were 5; 4 in Hampshire, and only 1 in Kent; and, what is very remarkable, not one in the whole of Yorkshire. The token of the town of Minehead bears as its device a woolpack, and on the reverse a ship, the usual symbol of a seaport-town; and the inscription declares it to be "the poor's farthing of Minehead." That of Taunton is a rebus, the letter T passed through a tun. Cross swords and a leg was the device of Ilminster, and a flower-pot that of Axminster, the origin of which last two symbols has never been explained.

One of the best and most interesting memorials of the manufacturing greatness of other days is the Lane Aisle, as it is called, in the church of Collumpton. It is beautiful in itself, particularly in its ceiling, and on the outer walls its founder has with honest pride indicated the source of his wealth in the sculptured implements of his trade as a wool stapler, and in the ships which symbolize his extensive commerce with foreign countries.

This great commercial activity has passed away from the West of England, and the mighty energies of our country are now dis-

* See Morley's very interesting 'Life of Palissy, the Potter.'

played in the Midland and Northern Counties; but not so the pride and delight with which the inhabitants of the Western districts, particularly those of Devonshire, regard their native counties,—a feature in their character which was alluded to and explained by a writer upon the agriculture of the West of England sixty years ago. Speaking of this change, he says:—

“Through a series of subsequent circumstances, which it would not be difficult to trace, the inhabitants of the body of the Island have long since gained the lead in what relates to the useful arts and modern improvements; a fact of which the mere provincialists of this western extremity of it do not appear to be yet sufficiently apprised, or, somewhat unfortunately for their country, cannot yet allow themselves to acknowledge.

“I endeavour to place this circumstance in what appears to me its just light, the rather as it has tended more than any other, perhaps, to prevent the country from profiting by modern discoveries. Indeed, of late years, the spirit of improvement has not slumbered more composedly in the Highlands of Scotland than it has in this part of England; and with respect to civilization and moral conduct among the lower classes of society, the Highlanders are very superior to the miners and mountaineers of Cornwall and Devonshire: a spirit of riot and outrage may be said to distinguish them from the other inhabitants of the island.”

If this be a just account of the people of Cornwall and Devon sixty years ago, which may well be doubted, all we can say is, that a thorough change in their character has long since taken place.

“The natives of Devonshire,” he adds, “are mostly of good person, tall, straight, and well-featured: many of the women are of elegant figure. In the habitudes and manners of the middle-class we find little which marks the inhabitants of this western extremity of the island from those of the more central part of it, except such provincial distinguishments as are observable in almost every district, excepting what arises from an over-rated estimate of themselves. This endemial habitude, which is not obvious to strangers only, but which the gentlemen of the county who mix with the world are the first to remark, may perhaps be accounted for without bringing any violent charge of personal vanity or want of natural sagacity against the present inhabitants.

“The coast of the English Channel, especially its more western part, was in much probability the first part of the island which was resorted to by civilized foreigners, and its inhabitants, of course, took the lead in the early stages of civilization in England, and were far advanced perhaps in urbanity and useful knowledge; while the inhabitants of the more central and northern districts remained in a state of barbarity and ignorance. Hence in reality they not only felt, but really possessed a well-grounded superiority.”

This certainly was the case. Cæsar describes the inhabitants of Kent as being by far the most civilized of the Britons, and so they were of those with whom he came into contact. But Diodorus Siculus, speaking of Cornwall some 300 years earlier than Cæsar did of Kent, and particularly of the inhabitants of that part of it near the Land's End, says:—

“They who dwell near the promontory of Britain, which is called Belerium (the Land's End), are singularly fond of strangers, and from their intercourse with foreign merchants are civilized in their habits. These people obtain the

tin by skilfully working the soil which produces it: this being rocky has earthy interstices, in which working the ore and then fusing it they reduce it to a metal; and when they have formed it into cubical shapes, they convey it to certain islands lying off Britain, named Ictis, for at the low tides the intervening space being laid dry they carry the tin there in great abundance."

These operations, of course, imply, besides the courteous treatment of strangers especially attributed to them, no inconsiderable acquaintance with mechanics and with other arts.

To the weakness, if weakness it may be called, of an intense love and admiration of their own county, the Devonshire people must still plead guilty, notwithstanding their freer communication with the rest of the world, and greater opportunities of comparing it with other districts; but if any competent and impartial judge is asked which is the loveliest county in England,—when he thinks of its mountains and its green valleys, its sparkling rivers and its gushing streams, its noble bays and rocky shores, its gentle climate, its fine old capital of Exeter, clustered round its grand cathedral, and its noble harbour and arsenal of Plymouth; and, more than all, when he remembers the kind friendly character and disposition of its inhabitants, he will probably say—Take it for all in all, there is no county like Devonshire.*

NOTES FROM NEW BOOKS, &c.

3.—*Extracts on Architecture, from an American Work on Villas and Cottages.* By CALVERT VAUX.†

IT is interesting to observe that the political economy of Art is not without its students and teachers in America. The following extract, having reference to prevailing defects in architectural practice, contains a truth equally applicable to both sides of the Atlantic:—

Page 14.—"Architecture within the last ten years has managed to get a genuine foothold in this department of building (magnificent hotels and stores); it has begun to pay, and that is an excellent sign, and one that affords food for reflection and solid encouragement; yet it is the few, and not the many, even here that speak of refinement and a love of grace, which is as averse to meretricious display as it is to ungainly awkwardness. Among the private residences a great number are excellent; but still the mass are unsatisfactory in form, proportion, colour, and light and shade. What is the reason of all this? Why is there comparatively so little beauty in American buildings? Some will say America is a dollar-loving country without taste for the arts; others that expense is the obstacle, and that the republican simplicity of America cannot afford the luxury of good architecture. The latter of these solutions is clearly incorrect, for it is knowledge, and not money, that is the chief source of every pleasurable emotion that may be caused by a building.

* Snelling's 'View of the Silver Coinage of England;' Marshall's 'Rural Economy of the West of England;' and Latham's 'Ethnology of the British Islands,' p. 43.

† Sampson Low, Son, and Co., 47, Ludgate Hill.

Indeed, a simple, well-planned structure costs less to execute, for the accommodation obtained, than an ill-planned one; and the fact of its being agreeable and effective or otherwise, does not depend on any ornament that may be superadded to the useful and necessary forms of which it is composed, but on the arrangement of those forms themselves, so that they may balance each other, and suggest the pleasant ideas of harmonious proportion, fitness, and agreeable variety to the eye, and through the eye to the mind. All this is simply a matter of study before building, not of additional cost in building."

Page 17.—"Continuous ease and leisure readily welcome art, while constant action and industry require time to become acquainted with its merits. To the former it may be a parasite, and yet be supported; to the latter it must be a friend or nothing."

The necessity of special instruction in the Arts has been very tardily admitted in England. In the following extracts a large and judicious appreciation of the good to be done to workmen through the press will be observed:—

Page 19.—"To insure workmen of ability a reasonable chance to improve is the chief thing wanted. So long as the general demand is for monotonous, common-place, stereotyped work, the average of ability will necessarily be low; but with opportunity, good, cheap, illustrated works, and a spirited weekly paper devoted to the special discussion of the subjects interesting to architects, engineers, carpenters, masons, and all the other trades connected with building—a paper that would diffuse sound theoretical and practical information on the art in general and in detail throughout the whole country—the advance would be rapidly felt. Self-supporting schools of design for painters, decorators, modellers, carvers, paper-stainers, &c., must follow in due course, for the positiveness of the need would soon be evident, and the object would then be almost gained."

The following passage asserts the intimate connexion between the habits of a people and their architecture:—

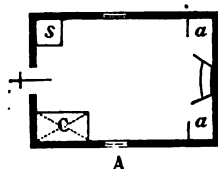
Page 20.—"The art of building faithfully portrays the social history of the people to whose need it ministers, but cannot get beyond those boundaries. We must remember, therefore, that principle of action, perceptions, convictions, habits of thought and customs, are the directors of all architectural design, and, that wherever and however it may exist, it is one of several national exponents, not an independent affair with a cut-and-dried theoretical existence. Good architecture of some kind must spring up in any society where there is a love of truth and nature, and a general diffused spirit of politeness in the ordinary habits of thought. Wherever, on the other hand, there is a wide-spread carelessness as to the development of the refined and perceptive faculties, there inevitably must be a monotonous standard of existence, and very paltry architecture as a necessary consequence; for the sense is being deadened by inaction or abuse, poor seeing, hearing, smelling, tasting, and feeling naturally result, and are reflected in the art of building, which exists entirely by supplying the demands of the bodily organs, and always shows whether they are vulgar, uncontrolled masters, galled serfs, or gay active workmen. It is, moreover, an act so constantly before us in some form or other, that it cannot help being a friend or enemy to the improvement of civilized beings all the days of their lives."

Making allowance for the special institutions of America and the nature of the audience which the author is addressing, there is much force in the following extract:—

Page 25.—“It is worth remembering, that no occupation need be undignified, no labour graceless. . . . It is clear, that hard manual labour is in no way removed from the highest developments of social philosophy and intellectual advancement. Every artisan, cultivator, or trader, may, if he think fit, not only be an honest, industrious republican, but a thoughtful, noble, and refined worker. All is within his easy reach. He has but to put forth his hand and pluck the fruit. The tree that bears it was planted by his ancestors, and is now daily tended, though perhaps unconsciously, by himself; and this wide-spread appreciation of the possibilities that are within reach of every class, this all-enriching civilization, or an approximation to it, is absolutely necessary before art can take another healthy stride in advance.”

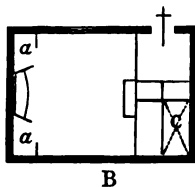
The following extracts contain a very important principle of house arrangement, well worth considering in its application to the building of labourers' cottages:—

Page 41.—“In any design that is intended to be used by an intelligent human being, the general distribution and detailed arrangement of the accommodation to be furnished, or what is called *the plan*,



is the first point that should occupy our attention; for the most simple idea admits of a good or bad arrangement. Let us take, for example, a house that is to consist of but one room, as in plan A. The door opens immediately opposite the fireplace; a cold draught is therefore likely to be constantly traversing the whole length of the floor of the apartment from the door to the fire; and, as the chimney is placed in the outer wall, a great deal of heat will be lost. Moreover the bed, c, and the sink, s, are entirely exposed to view; and thus privacy and cleanliness are scarcely possible. Now, a man may, with comfort and decency, make his kitchen his living room; but he will find it disagreeable if he has in addition to use it as a bed-room and sink-room. It is therefore desirable to improve on this plan.

The diagram B shows a different and in every way a more sensible and convenient arrangement of the same space. Here the doors and chimney are so placed with reference to each other that the minimum of draught occurs in the room when the door is opened. The chimney is built in the body of the house, so that as much heat as possible is saved. A few feet of board partition set at the back of the chimney supplies a somewhat private recess for a bed, and also an entrance-lobby with room for the sink; and the principal room and both recesses may communicate by means of tin



pipes through the ceiling, with an air-flue carried up alongside the smoke-flue, thus thoroughly ventilating the whole building. The two closets are placed at the other end of the room, so that a window-seat, that may also be a locker to contain a supply of coal, can be arranged between them, thus rendering the interior appearance of the room more agreeable; and a strip of curtain, or, if thought worth while, a light door, hung on each side of the chimney-board, will give privacy and an air of snugness to the whole arrangement. Now, this plan in execution would cost perhaps 10 dollars more than the other; and, taking the interest of this 10 dollars at 10 per cent., the cash difference to the occupier would be 1 dollar a-year, while the *comfort* difference to any one with the slightest taste for that blessing would be incalculable.”

4.—*Farm and County School, at West Buckland, North Devon.*

A FARM and County School for the education of sons of farmers has been established at West Buckland, under the auspices of the Rev. Prebendary Brereton. From an explanation of the principles and plan of the school,* published before the school was actually established, the following extracts are made:—

"In proposing to substitute farm for grammar schools, I am assuming that the practice of agriculture has become in England sufficiently scientific to form a distinctive branch of education, and is capable of being combined with the necessary parts of an Englishman's instruction. This is a point upon which much of my plan turns, and on which I must appeal with deference to the opinion of our more enlightened agriculturists. I need not enlarge on the healthfulness of body and mind which the practical cultivation of animal and vegetable life promotes, and on the constant recreation which would result from a well-combined plan of in-door and out-door pursuits. It is well known how much the success of our great public schools depends on the encouragement given to out-door sports. But it would not be consistent with the views of the middle class that so much time should be spent in mere amusement, and that the risk should be run, of boys leaving school with greater proficiency in cricket than in learning. But it would be no great injury to the prospect of lads if they were to carry away from schools a keener interest in out-door farming than the in-door clerkship.

The general plan which had suggested itself to me was this,—

- (1.) The establishment, in each hundred, or in each registration division of the county, of a Public School with farm attached.
- (2.) A County College, with larger farm and more complete appliances for practical and scientific instruction, for more advanced students.
- (3.) An Annual Examination, resulting in degrees and honors.

I propose that the school shall consist of boarders and day scholars, at the following charges:—

Tuition for Day Scholars.

For 7 hours per day	..	..	..	10	Guineas	per annum.
5	"	..	..	8	"	
3	"	..	..	5	"	

Boarders.

- (A) 45*l.* per annum for boarders who do not work on the farm, and who receive 7 hours' instruction.
- (B) 35*l.* per annum for boarders who work 3 hours on the farm, and receive 7 hours' instruction.
- (C) 20*l.* per annum for boarders who work 5 hours on the farm, and receive 5 hours' instruction.
- (D) 10*l.* per annum for boarders who work 7 hours on the farm, and receive 3 hours' instruction.†

The following is an outline of the proposed plan of instruction, and the distribution of hours:—

* 'Principles and Plan of a Farm and County School,' by the Rev. J. L. Brereton, Rector of West Buckland. London: Ridgway, 1858.

† Pupils in A and B will sleep in the master's house; those in C and D in the bailiff's: but all will dine together.

Subjects of Study.—The ordinary course of instruction in the school will comprise—

I. English Language and Literature, including—(a) Writing correctly from dictation, the composition of letters, and, in general, the power of freely expressing the thoughts in writing; (b) English Grammar, and the analysis of sentences. And, for the more advanced boys, (c) the outlines of the History of the English Language and of English Literature; (d) the works of one (or more) standard English author; (e) the principles of Political Economy and of English Law.

II. Writing.

III. Reading with ease, fluency, and expression.

IV. Mathematics, including—(a) a thorough knowledge of Arithmetic; (b) Book-keeping; (c) Mensuration; (d) Algebra; (e) Euclid. And, for the more advanced boys, (f) Plane Trigonometry; (g) the use of Logarithms.

V. Geography.

A general knowledge of the outlines of Geography, and the use of the Globes; with a more particular knowledge of the Geography of England and of the English Colonies. And, for the more advanced pupils, (a) Physical, (b) Political, and (d) Commercial Geography.

VI. History.—(a) The Outlines of English History; (b) a more full knowledge of some important period of English History, viz.,—the Reformation—the Revolution—the last French War.

VII. Religious Instruction.*

Extra Subjects of Instruction.—I. Latin; II. Chemistry; III. Mechanics; IV. the outlines of European History, with a more detailed account of some particular period, viz. the Thirty Years' War; V. Music.

Plan of Hours.—7 to 8 A.M., Farm or School; 8 to 9, Prayers and Breakfast; 9 to 11, School; 11 to 12, Farm or School; 12 to 1 P.M., Farm or Play; 1 to 2, Dinner; 2 to 3, Farm or Play; 3 to 5, School; 5 to 6, Farm or Play; 6 to —, Tea; 7 to —, School; 8 to —, Amusement; 9 to —, Prayers and Bed.

The farm will be conducted on the four-course system. A sufficient number of sheep to supply the establishment will be folded on turnips in winter; on grass, clover, and vetches in summer. Dairy cows and pigs will also be kept; so that the daily attendance upon live stock will be a principal part of the employment. And it is thought that those lads who are intended to be farmers will derive great advantage from the opportunity of regularly observing the results of converting live stock into dead meat, as regards both weight and quality. The same advantage will result from the consumption of all the grain grown on the farm, and in the shape of bread and meal, as food for men and animals.†

How far the farm will supply all the wants of the establishment will depend, of course, upon the number and quality of the acres that will be available, and the number of boarders that will be received. . . . My wish would be, to have a school capable of containing 50 boarders, and a farm attached to it of 100 acres. But I cannot hope, at present, to reach anything like this standard; and I should be content to make the beginning

* The character of the instruction and the text-books used will be in general accordance with the principles of the Established Church; but the wishes of parents in each case would be scrupulously consulted.

† The difference is great between a plan on paper and a plan in use. Though I have bestowed some pains on the above, I lay no stress on the details, except as illustrations of the experiment I am anxious to try.

if I could receive encouragement enough to start with one-fifth of the number, i. e. with 10 boarders and 20 acres of ground.

To furnish the premises which Lord Fortescue has offered me, and to stock the 20 acres of ground, I should require 250*l.* at least; and I should be glad to raise this money in the shape of a loan, at moderate interest, to be paid off if the school flourished; so that any profits that might be derived from a successful school should go to the development and enlargement of the school itself. I think this would be better than a proprietary school, in which the profits would go to the shareholders."

5.—*Prevention of Fever in Agricultural Districts.*

DR. ACLAND, Regius Professor of Medicine in the University of Oxford, has, in the form of a pamphlet,* published a report of his investigation into the causes of a serious visitation of fever, at Great Horwood, in the county of Buckingham. The inquiry was instituted at the request of the Winslow Board of Guardians, and in the performance of his duty Dr. Acland was accompanied by Mr. Wynter, the Medical Officer of the Union. The pamphlet describes the district in which the fever had become endemic; gives in popular terms the general characteristics of the disease; and concludes by tracing out and exposing the evils to which the visitation was attributable. The information, though apparently local in its interest, is more or less applicable to every rural district in the kingdom; and the remedial suggestions are entitled to grave consideration by every employer of labour. Dr. Acland recommends for Great Horwood and "every district" the erection of a model cottage for the guidance of landowners; and after describing such a structure, concludes with a summary of the steps which he advises for the correction and future prevention of the evil. The following are, in Dr. Acland's opinion, the essentials of a healthy cottage:—

"1. Detached or double cottages are preferable to rows. Double cottages are perhaps the best of the three.

"2. The angles, not the sides of the building, should be placed to the cardinal points of the compass. They should stand *in* their garden-plot; that is, a little way back from their front boundary.

"3. The garden should, if practicable, contain from a sixth to a quarter of an acre. The privy should be at the extreme end, with the pigstye, if there be one. But as it is very doubtful whether a pig is a real advantage to a small family living on small means, and as it is certain that a pigstye is in itself an evil, pigs are to be tolerated, not to be encouraged.

"4. A drain from the back-door to the privy should carry surface-drainage and house-slops to the privy; and thence, wherever practicable, another drain should lead to a tank for distribution by the farmers to meadow or other land. The cesspool should be a closed one, if a cesspool is necessarily employed, and agreements should be made for periodically removing its contents.

"5. Tiles or slates, not thatch, are to be used.

* London: Parkers, 1858.

"6. A back as well as a front door: windows on both sides of the tenement, if in a row: or on three sides, if in a double cottage. A window in the pantry. Both sashes to open, where sashes are used; both casements, where there are double casements.

"7. The day-room to have in its chimney an Arnott's valve or the better arrangement of an air-tube or separate flue. The floor to be made with a boarded centre, and hard flags or tile border, set in concrete. The floors to be raised 6 inches at least above the outer road. The back-room to have a fireplace, with boiler attached, and a well-trapped sink.

"8. Three bedrooms: for parents, boys, and girls. Height of rooms to be 8 feet: the top of the windows to reach the ceiling. A fireplace to be in one room at least, a ventilating tube in the other two.

"9. The front room and bedrooms to be approached from a porch: the staircase may be open to the room, or closed.

"10. Where rows of houses exist, a washhouse in common to all the houses should be contrived in the garden. It may be next a row of wood-houses and tool-houses, and have a common pump adjoining. Its drain to go to the privy.*

"11. The privy in every case to be removed as far as possible from the water supply."

6.—*The Allotment System for Agricultural Labourers.*

THIS subject recently engaged the attention of the London Farmers' Club. It was introduced by Mr. Trethewy, Agent to Earl De Grey, at Silsoe, Bedfordshire. This gentleman has under his management 750 allotments of land to the labourers of six parishes on the property of Earl De Grey. They are let at a fair agricultural rent, *i. e.*, from 1*l.* 12*s.* to 3*l.* 12*s.* per acre; they are near the villages where the labourers live; they are of suitable soil, and accordingly they have proved of the greatest benefit. The collection of the rents occupies five days once a-year, and there is very rarely a defaulter. No restrictions are laid upon the tenants as to cultivation, excepting such as are also laid upon the tenants of the neighbouring farms. A barn is allowed in each parish for the threshing out of the produce; and in everything the treatment of the men appears to be of the most liberal kind. The result is seen in the increase of their comfort and prosperity.

The following Table shows the extent to which, in some of the parishes referred to, the system is carried out. The results

* "It would be needless to go into further detail: ample information may be obtained, as well as specifications of small dwellings, from the Sanitary Report, 1842; from the admirable volume, 'The Dwellings of the Labouring Classes,' by Roberts; and from the Journals of the Royal Agricultural Society, and also of the Bath and West of England Agricultural Society, for the year 1856 (Ridgway, London): in these valuable periodicals, copious details are given in a prize essay by Mr. Isaac of Bath. . . . My object is to aid small capitalists and small builders in the way of making the cottages which they build as free from fault as possible, and at the same time of making them serve as investments as well (if this word may be used) as they do now."—*Note by Dr. Acland.*

indicated in the reduction of poor's-rate are probably also attributable to the alteration of the Poor-laws a quarter of a century ago:—

Parishes.	Extent.	Number of Allotments.	Acreage of Allotments.	Average Annual Poor's-rate during Five Years ending		Poor's-rate during	
				1854.	1848.	1838.	1828.*
	Acres.		Acres.	s. d.	s. d.	s. d.	s. d.
1	2000	78	24	2 10	2 3	2 6	7 5
2	2300	180	55	4 4	4 0	4 9	7 4
3	1000	163	140	5 2	4 10	4 0	13 0
4	1500	131	51	3 2	3 6	3 8	11 0

It should be remarked that in the discussion which followed the reading of the paper all the speakers were agreed as to the advantages resulting from the system, and all concurred in the recommendation that the size of the portion allotted should not exceed one-quarter or one-eighth of an acre, at a fair and reasonable rent. On this subject it has been remarked that the size is a most important point, for "if more land be given than the labourer can well cultivate at his leisure hours, the system will be attended with great evil, as the results will be the same as giving a farmer too large a holding for his capital—both the man and the farm will be ruined." What is done should be well done. Neither master nor man should be satisfied with anything short of this.

7.—The Half-Time System of Education in Rural Districts.

AT the Liverpool Meeting of the Association of Social Science held last year, a paper was read by Mr. C. Paget, M.P., in which he detailed the 'Results of an experiment on the Half-Time System of Education in Rural Districts, as carried on at Rudlington, Nottinghamshire.' From this paper, since published as a pamphlet,* we make the following extract:—

"In November, 1854, I determined to employ eight boys on my farm, to do the work hitherto performed by four, each boy spending half his day at work, and half at school—relieving each other, so that I should always have four on the farm and four at school. I found an inconvenience in this arrangement; when the boys' clothes were wet and dirty, from their morning's work, they were unfit for school. I therefore changed my method, and the boys now work on alternate days. After four years' experience, I speak confidently of the satisfactory working of this system. As an employer of labour, I have very reason to be satisfied with it. The boys, having an alternate day of rest, work with more pleasure and spirit; and I have no difficulty in finding as many willing to accept employment, on these conditions, as I want. The parent, who might feel the entire loss of his son's wages to be too great a sacri-

* London: Bell and Daldy, 1859.

fice, is willing to forego one-half the amount to secure to him the advantages of an education which does not interfere with the acquisition of the knowledge which is essential to his power of maintaining himself at an early age. The great advantage, however, is to the children themselves. They are never weary either of school or of work. Their progress is found to be very nearly equal to that of those whose sole business is attending school. At fourteen years they have received not only a very fair amount of the rudiments of school-learning, but they have also acquired a knowledge of the business of life, and are ready to enter into service with all that skill arising from habits of labour, combined with hardihood from exposure in out-of-doors work, which the farmer who hires them has a right to expect. They are much better servants than the mere schoolboy could be. Their school-life being compared, not with a holiday, but with a day of labour, they look upon it as a rest, and their associations with books are not irksome, but agreeable; so that, as a rule, they will retain what they have acquired. The schoolmaster also feels the advantage of this system. The boys attend more regularly than the average of children; and, remaining to a later age, their attainments are higher, and they give a higher tone to the school. Mr. Spencer, the master of our free-school, declares, that any master who has once experienced the benefits of the system will be very unwilling to forego them. In the first week of October, 1858, I examined three of the boys now working on my farm who have been upon this system a considerable time, and who are about to leave school; two being thirteen, and one just fourteen years of age. I found that they all read intelligently and well. They wrote from dictation, from a book which they had not previously seen, in a clear hand, and with few mistakes. In arithmetic I dictated sums, which satisfied me as to their knowledge of numeration. I found them quite familiar with the first four rules of arithmetic, and reduction, and compound multiplication. The best evidence I can give of the value entertained by the labouring classes for this system, is the statement that they voluntarily adopt it in their own arrangements. In addition to sixteen, who are working as pairs in agricultural labour, there are several pairs employed in the winding and seaming, belonging to the stocking manufactory, and several girls, who assist the mother in her domestic duties alternately; and I have good reason to believe that in both these cases the system works very satisfactorily. If every parish were blessed with a schoolmaster as benevolent, zealous, and intelligent as the master of our free-school, I do not believe there would be any difficulty in the wide extension of this system. Where, in close parishes, the possessors of estates compel the labourers to live in adjoining villages, in order that they may keep down their poor-rates, no doubt there may be difficulty in providing pairs in sufficient number for the convenience of the farmers; but this is only one of the many evils arising from the existing law of rating, which are so serious in their effect upon the moral and sanitary condition of the people, that they must ere long attract the attention of the Legislature. This alternate system of labour and rest appears to be indicated by our nature, in which the activity of the body is a good preparation for the activity of the mind; and every hard-working professional man has found that the best rest for his overtasked mind is in bodily exertion. Much more than satisfied with the result of my experiment, I would earnestly request that any of the friends of education who may have it in their power will repeat it. The principle is one which admits of a very wide application. Already has a manufacturer in Nottingham adopted it with satisfactory results to the forty boys in his employ; and I believe that our middle classes might give their sons, up to the age of twenty, an alternation of a day of college and gymnastic exercises, with a day in the counting-house; and thus, with God's blessing, confer upon them that inestimable boon, a sound mind, embodied in a healthy frame."

8.—*Agricultural Implements. The Experience of 1858.*

It is remarked by M. de Lavergne that when the Great Exhibition of 1851 attracted to London an immense concourse of the curious from all parts of the world, what most astonished the stranger was—not the great show which the productions of Manchester, Birmingham, Sheffield, and Leeds made under the transparent roof of the Crystal Palace, but—the agricultural development displayed in those departments of the Exhibition set apart for implements of husbandry and English agricultural produce. “Everywhere,” says the observant traveller, “mechanical genius is making exertions to carry into agriculture the wonders it has elsewhere realised.”* Of the truth of this remark the experience of the last eight years has afforded abundant proof; and the marvellous increase in the number of implements exhibited at shows of the Royal, the Highland, and the Bath and West of England Agricultural Societies, proves to demonstration that a demand has sprung up which can only be attributed to a widespread spirit of enlightened enterprise in the agricultural body. The Report of the Judges of Implements at the Cardiff Meeting in this Journal renders it unnecessary to particularise various instances wherein great improvement has been made; but the following paper on

Reaping Machinery

which was read by Mr. Alfred Crosskill, to the Mechanical Section of the British Association at Leeds, A.D. 1858, contains much valuable information, not warped in any material degree by the supposed partialities of the writer:—

“The paper on Reaping Machinery which I read before the Mechanical Section in the year 1853, at the meeting of the British Association in Hull, contained a general history of all the early inventions for reaping on record, none of which excited any interest, or were generally known to the public, prior to the Great Exhibition of 1851, when the introduction there of two reaping machines from America drew general attention to the subject. Mr. Garrett, Messrs. Ransomes (of Ipswich), Mr. Samuelson, and the father of the writer (Mr. William Crosskill) immediately took a prominent part in introducing reaping machinery into the harvest-fields of this country; and Mr. Crosskill succeeded in bringing into general notice, and subsequently into practical operation, a reaper which had been in existence in Scotland, and worked there by its owner, for nearly twenty years, but which, for want of practical knowledge in perfecting its mechanical construction, had scarcely been heard of during that time beyond the limits of the district in which it was originally put together.

“The two American reapers, known respectively as Hussey’s and M’Cormick’s, and the Scotch machine, called “Bell’s,” after its originator, who was a minister in Fifeshire, were in 1853 the only implements capable of doing any practical work in the harvest-fields; and though they have during the

* ‘Rural Economy of England, Scotland, and Ireland,’ by Léonce de Lavergne. Translated from the French. London: Blackwoods, 1855.

succeeding five years been greatly improved, modified, and re-constructed as experience has shown to be necessary to meet the varied requirements of English agriculture, they still retain their distinctive peculiarities sufficiently to divide reaping machines into three separate classes or varieties, and all the schemes and novelties which have been brought forward since the year 1852 have either failed and been laid aside, or have resolved themselves into variations of one of the three machines first established.

"Before describing the fundamental differences in the construction of these three reapers, and briefly indicating the important improvements that have been made in them since their introduction, it is desirable briefly to point out the work which has to be accomplished by an efficient machine for reaping. Most inventors or mechanics who for the first time turn their attention to this subject occupy themselves almost exclusively with the cutting apparatus, apparently overlooking that the convenient disposal or delivery of the cut corn is a very important part of the functions of reaping machines, and has, in fact, been the real difficulty in bringing them into practical use. The cutting parts of all the reapers have for a length of time been sufficiently perfect to encounter successfully every crop that they can reasonably be required to cut; but to obtain an efficient means of delivery has taxed to the utmost the patience, perseverance, and ingenuity of all who have been engaged with the subject, and considerable difficulty has been experienced in perfecting an arrangement that will satisfactorily deliver all descriptions of grain.

"The only efficient cutting apparatus hitherto brought into practical use consists of a series of V-shaped knives fixed side by side on a light moveable bar, extending across the whole width of the front part of the reapers, and connected, by means of gearing and a crank, to the main wheels which carry them, so that as they travel forwards a rapid reciprocating motion is communicated to the knives. They pass between and cut against fixed guards or fingers, which support the straw and prevent it from yielding sideways, and serve also to protect the knives from injury on rough and stony ground.

"The shape of the knives varies in the different machines; in Hussey's they form a very acute angle with the guards, are plain-edged, sharp, and chop off the straw by means of their rapid motion through the fingers. Mr. McCormick's knife has a serrated edge with an obtuse angle, and requires the aid of a fan or reel to hold the corn in order to cut clean, but it is much more easily worked, more durable, and less liable to choke, than Hussey's, and by those who have tried both is generally preferred. Bell's original machine cut by means of shears resembling large scissors; but though very efficient in operation they were found difficult to keep in order, and a serrated knife something like McCormick's was substituted for the shears in the year 1854, and has been successfully used since that time. An inspection of the models will enable any one to understand the general action of the cutters and guards, and the special difference between each variety of knife is shown by the specimens on the table.

"It is worthy of remark in connexion with the cutting apparatus, that numerous endeavours have from time to time been made to supersede the necessity of giving a reciprocating motion to the knives, as the reverse action is a source of considerable loss of power, and the tremulous vibration it produces in the machines is a great cause of their wear and tear. All attempts have, however, hitherto failed in producing an efficient cutter with a continuous motion, and in the opinion of the writer there is little probability of their success, as actual experience in the harvest-field seems to prove that the reverse or reciprocating motion of the bar and knives is necessary to shake out from the guards pieces of short straw, grass, weeds, and other substances which constantly collect there, and if not quickly removed soon choke them up and stop the action of the cutters. A complete collection of all the schemes known

to have been projected for cutting corn, was published by Mr. Woodcroft, of the Patent Office, in the year 1852, and forms a record worthy of the attention of the curious in such matters; it should serve also as a warning to inventors generally to make actual trials of their crude schemes before wasting their money in taking out patents for them, as the great majority turn out entirely worthless in practice.

"The different methods of delivering the cut corn will be best understood from a brief description of how it is disposed of by each machine, beginning with Hussey's, which is the simplest, and may be termed the elementary reaper. In this implement the corn falls, as it is cut, upon a platform behind the knives; a man rides on the box which covers the wheels and other gearing, and forms a seat for him; and as soon as a sufficient quantity has collected to form a sheaf, he pushes it off the platform by means of a rake with which he is provided. When this operation is performed by a skilful workman on a moderately light crop, which can be managed without too much exertion, it has a particularly neat and tidy appearance, the corn is left in sheaves, ready for binding immediately; and the result is attained by the simplest possible means, as there is no gearing required except that for driving the cutters; and the simplicity of the implement contrasts strikingly with others which have machinery necessarily more or less complicated for effecting the delivery of the cut corn. On the other hand, to do the work neatly and efficiently, requires a man both strong and skilful, especially where the crops are heavy, and such a man is not always to be obtained. It is, therefore, not surprising that this machine is much better liked in America, where the crops are generally thin and light, than in this country, where on all good farms the weight of the produce is too great to admit of its being readily moved as fast as cut by the unaided strength of a single workman. It will also be observed that the sheaves are deposited on the ground behind the machine, and must therefore be removed out of the way of the horses before they can pass to make the next cut; and in practice this is found a great disadvantage in comparison with the work of the machines with self-acting deliveries, which deposit the cut corn on one side, so that its instant removal is not necessary.

"M'Cormick's reaper, as first introduced from America in 1851, resembled Hussey's in requiring a man to ride on it for the purpose of raking off the cut corn, but the gearing was placed before the platform, so that the sheaves could be raked off to the side of the machine, where they were out of the way of the horses when making the next cut; but the work of the man was far more laborious than with Hussey's reaper; and in most of the heavy crops of this country it could not be performed. This difficulty with M'Cormick's machine was overcome by Messrs. Burgess and Key, of London, who constructed and patented for it a self-acting apparatus for delivering, consisting of three rollers in the form of endless screws, which carry the cut corn off at the side of the machine, and leave it in a continuous swathe ready for taking up and binding. The engraving of the reaper at work shows the action of the screw delivery, and is a very good representation of the implement drawn by two horses and driven by a boy. Since the introduction of Messrs. Burgess and Key's improvements, this machine has been very extensively used; and when managed with proper care and attention, is capable of doing excellent service.

"In Bell's reaper, as improved and re-constructed at Beverley, under the direction of the writer, the delivery is effected by means of a number of endless bands of vulcanized India-rubber, fitted with projecting pieces of wood, which carry the cut corn to the side of the machine and deposit it on the ground in a regular and continuous swathe, as shown in the engraving. In the original machine a cloth carried along by pitch chains was employed for this purpose, but the bands are found equally efficient, not so liable to get

out of order, and more easily worked by the horses than the cloth and pitch chains. The large model on the table is fitted with the shears and the cloth, as used in the original machine; the small models show the improvements which have been made in it, and the form in which it has been practically found to work best.

"It will be observed that both the machines, with self-acting delivery, leave the corn in a continuous swathe, which must be raked together for binding, and a practically useful intermittent, or sheaf-delivery, has not yet been effected by machinery, although several attempts have, from time to time, been made to accomplish it.

"A cursory inspection of the models and engravings shows a striking difference in the general arrangement and construction between Bell's reaper and that of both the American machines just described. In the latter the horses walk by the side of the corn to be cut, and draw by means of a pole connected to one side or end of the machine—a mode of attachment productive of considerable twist or torsion, especially when the work is severe. Bell's machine goes before the horses, and is propelled by means of a long pole passing between them, to the end of which they are harnessed, and by means of which the man who follows and drives them steers the reaper in any direction. This mode of attachment is attended with the great advantage of enabling the machine to deliver the cut corn on either side, while all the reapers which have the horses in front are confined to one side only for delivery, and cannot go backward and forward along a field, but must either go round the crop, or, when circumstances render this impracticable, must return idle; on the other hand, machines having the horses in front are somewhat more manageable and easily turned than Bell's, and, in cases of need, a third horse can be yoked in front, which is not practicable when the machine is placed first. For these and other reasons connected with practical convenience, both makers and users of reapers are much divided in opinion as to which is the best way of attaching the horses. Both methods have warm advocates, and it appears probable that until considerably more experience has been gained in the practical use of reaping machinery, and perhaps even after that, on account of the variation in convenience under different circumstances, both methods will continue to be employed.

"It will be observed, also, both the machines with self-acting delivery carry in front of the cutters an apparatus called a fan or reel, which revolves slowly as the machine advances, puts back the corn, and insures its falling in the proper direction; an operation which in Hussey's machine is done, when necessary, by the man with the rake.

"A general description of reaping machinery would not be complete without an allusion to various ingenious contrivances which have been projected from time to time for the purpose of delivering the cut corn. Through the kindness of Messrs. Ransomes and Sims, of Ipswich, I am able to exhibit a working model of one of these, consisting of an exceedingly curious automaton or self-acting rake, invented by a youth in America, named Atkins, and sent over to England in 1853. It was applied to a machine similar in construction to Hussey's, and was intended to deposit the corn on the ground in sheaves; but it has not yet been made to do so in a sufficiently perfect manner to justify its general introduction, although its extreme beauty and ingenuity lead to the hope that it will at some time be turned to account. Another machine, with a very clever contrivance for giving a self-acting motion to a rake for performing the work done by the man on Hussey's reaper, has just been sent over from the United States to Mr. Samuelson, of Banbury, by Messrs. Seymour and Morgan, of Brockport, near New York; it has been named the "*Britannia Reaper*," and the *Mark Lane Express* and other agricultural journals contain accounts of various successful trials

that have just been made with it in the North of England. Having seen it for the first time only a few days ago, I have been unable to get a model of it for exhibition here, and the mechanical arrangements are so peculiar, that a description of them would be unintelligible without a model. I may state, however, that there is every probability of its turning out practical and useful as well as ingenious, and in the hands of Mr. Samuelson we may rest assured that its capabilities will be fully developed.

"In making a few observations on the practical use of reaping machinery, it is necessary to direct attention to the extremely variable and uncertain nature of the circumstances under which it has to operate. A week of heavy rain before harvest will sometimes lay the corn in whole districts, so that it cannot even be mown with a scythe, and it is not probable that machinery will ever be made to work under unfavourable circumstances of this description. It is, however, certain that the reapers as at present constructed are able to render important assistance to the farmer in moderately favourable seasons.

"The use of both reaping machines with self-acting delivery is steadily extending; and as agriculturists and their men become more accustomed to them, their introduction will be still more rapid; for, owing to the high price of labour during harvest, they effect a considerable saving in the cost of cutting the crop, and enable the farmer to take more advantage of favourable weather than he can do by the uncertain aid of the limited number of men that can be procured at that period of the year.

"It is also worthy of remark in connection with this part of the subject, that, excepting the locomotive engine, there is no machine in use which requires to be manufactured with so much care and regard to durability as the reaper. Almost all other machines used either in agriculture or manufactures do their work when at rest, and secured to substantial foundations. Even those constructed to move from place to place are, before being put in motion, fastened down, to prevent, as far as possible, the destructive consequences of oscillation and vibration. The reaper is, on the contrary, not only exposed to all the strains consequent on passing over every description of uneven ground with its machinery in action, but it is also subject to the effects of continual tremulous vibration, caused by the quick reciprocating motion of the knives.

"It is, therefore, not surprising that the introduction of reaping machines has been attended with considerable difficulties, especially as they have had to be worked by men but little accustomed to the use of machinery. In this respect, however, the last few years have witnessed a great change. The assistance of the steam engine is already felt by most farmers to be a necessity in carrying on all extensive operations with efficiency and economy, and the general use of improved machinery cannot fail to produce a corresponding improvement in the condition of the agricultural labourer, and will accelerate the completion of that progressive revolution which, since the abrogation of legislative protection, has been rapidly taking place in every department of practical agriculture."

9.—*Steam in the Household.—Bread made by Machinery.*

"MACHINERY for the making of bread has lately been introduced into this country by Mr. Miller, a baker in the Edgeware-road, who also adopts some modifications of the usual process of preparing the dough. The machinery comprises a mixing machine, a kneading machine, and a machine for forming the loaves. The mixing machine consists of an iron cylinder, through which a horizontal axis passes, having a series of beaters, or blunt knives, fixed at right angles to it. Each knife or beater is bent round, in the form of an

oblong parallelogram, which extends from the axis to within a short distance of the inner surface of the cylinder. The cylinder is steadfast, while the axis carrying the beaters revolves inside. The materials for making the bread are placed inside the cylinder, and in a very short time, by the action of the machine, they are thoroughly mixed. The kneading is performed by passing masses of the mixed material, after it has stood a sufficient time, through a pair of steel rollers several times, and thus it becomes kneaded and thoroughly amalgamated into a uniform dough, suited for passing into the next machine, which forms it into loaves. This machine consists of a sloping platform, which delivers the dough into a pair of steel rollers working horizontally at the end of it, capable of adjustment to any suitable distance. Beneath those rollers revolves an endless web, which, by means of a simple mechanical arrangement, is carried step by step the exact space required for the cutter, which stamps out the loaves from the dough in succession, as it is carried along the web in a thin uniform sheet. The pieces of dough thus cut, which are not more than three-quarters of an inch thick, are set side by side on flat tins, and placed in a warm atmosphere for about thirty or forty minutes, until the dough has risen somewhat, when they are put in the oven. The modified process for making the bread is as follows:—The dough after it has been mixed and kneaded in the usual way for making bread, is kept in fermentation for about six hours or more, until it has reached the acetous state, and become unfit for use in the ordinary process, when there is added to it one-fifth of its weight of dry fresh flour, and without any additional water it is mixed and broken rapidly and very thoroughly through rollers, cut and pierced in a cutting machine, or by other means, and after a slight fermentation in an uncovered state exposed freely to the air, say, for thirty or forty minutes, according to the temperature of the room, to raise it, baked in a quick oven, which should be ventilated by an open door or other means of admitting and discharging the air freely. In making the dough, about ninety-five pounds of water to two hundred pounds of flour are used, and from this weight there result usually two hundred and sixty-two pounds of baked bread. The invention is applicable in making bread from any kind of flour of which bread may be made, and is said to produce the same beneficial result in the use of all kinds. The moving cylinder in use at Mr. Miller's is sufficiently large to take half a sack of flour at a time. The whole of the machinery is driven by a small steam-engine of two-horse power. The machinery and process generally are American inventions, and form the subject of patents in that country as well as in this."—*Journal of the Society of Arts*, March 4th, 1859.

10.—*Steam Cultivation. Hollett's Guideway Agriculture.*

It has been remarked that the civilization of a country may be determined by the quantity of iron it uses. Leaving other nations out of the question the test may be fairly applied to England, which is singularly rich in the possession of mines of this valuable and characteristic metal; and every day's experience shows that properly to develop the material resources of the country, whether agricultural or otherwise, the use of iron implements must be made of it. It is especially so in the case of implements where great power and durability are required, and the strength and durability which iron gives to the implements, with the economy of tension, are of great importance. The use of iron in the construction of

importance.* That cast-iron will sooner or later be employed on the farm to a far greater extent than has yet been the case, no reflecting mind can doubt. Even in the lighter fittings of farm buildings—such, for instance, as in the construction of roofs of large span, the fitting up of water-cisterns, troughs, mangers, stall-divisions and fronts, and a variety of other purposes—cast-iron may be very advantageously applied, but it is principally in the formation of agricultural tramroads and railways that a demand for it may be expected to spring up. This notion was first started by Mr. W. Bridges Adams, C. E.† In the year 1845 an article by this gentleman appeared in the ‘Westminster Review,’ wherein he propounded the theory of rails on cultivated land for the purpose of conveying heat and injecting liquid manure into the land by means of steam. Nothing seems to have resulted from this, but in 1850 he published a work called ‘Road Progress,’ advocating the amalgamation of railways and highways as a means of promoting agricultural improvement and steam farming in Great Britain and the Colonies. In 1851, in an article in the ‘Westminster Review,’ Mr. Adams again agitated the question, contending for a system of farm railways and maintaining that permanent as well as moveable ways would be needed. Nothing practical, however, was attempted or introduced to the public until the 8th of December last (1858), when, at a meeting of the Society of Arts, in London—(Mr. T. D. Acland in the chair)—Mr. P. A. Halkett read his paper on ‘Guideway Agriculture;’ by which term he designates a scheme for “enabling all the operations of the farm to be performed by steam power.” This paper, with illustrative diagrams, will be found at length in the ‘Journal of the Society of Arts’ (vol. vii. No. 316). The invention comprises a system of permanent way which is fixed to the ground, and consists in the application of motive power to the cultivation of the land, by attaching the implements required for the various operations of ploughing, scarifying, sowing, hoeing, reaping, or other operations of culture, beneath a travelling carriage, which moves on rails placed in parallel lines across the fields to be cultivated, by which the implements are always kept from swerving to the right or left of the line of onward motion, and the friction of the machinery is considerably reduced. The gauge or space between the lines should be as wide as possible, consistent with the practical application of the travelling carriage or cultivator, in order to diminish the cost of rails by reducing the number per acre as also the extent of space between the permanent way. The width between the lines

which the inventor has in use upon his land at Wandsworth, or upon the piece of ground at Canning Place, Kensington toll-gate, is 80 feet; but there can be no difficulty in extending it to 50 or more feet. At right angles to those rails, along the headlands, separate railways are made on a lower level than the former rails, and upon each headland railway a carriage is placed, the top surface of which is on a level with the field rails, and upon this the cultivating machinery moves and is transferred sideways from one set of rails to another or home to the steading, where it may be used for barn operations; supposing then the ground between the two first rails to have been operated upon, the machine is propelled on to the headland carriage, and by it transferred or shunted in the manner that carriages are shunted on railroads to the next breadth of rails, down which the cultivator proceeds; and so on until it has passed over all the land to be cultivated.

"The cultivator is driven by two engines, placed at the extreme ends or sides, which are geared together by an intermediate shaft, the ends being connected to the ends of the platform in such a manner that the whole set, 16 in number, act simultaneously as driving-wheels. By being thus constructed, the machinery can ascend rising ground without difficulty, till the gradient reaches the point when iron slips upon iron, which is found to be one in five.

"The quantity of land that can be ploughed per day by machinery, suitable to a farm of 1000 acres, is 25 acres; and two, or at the most three, men are all that are required to conduct this or any other operation; and, when time presses, by a change of men, double this amount, namely, 50 acres, may be done in the twenty-four hours, because the operation can be carried on by night as well as by day."

The inventor says he has ploughed on a very dark and rainy night, and, although it was too dark to see the ploughs, in the morning it was found that some excellent furrows had been turned. It will be admitted that (if practicable), it is of the utmost importance to be thus able to break up the land in unfavourable weather, or for a rapid autumnal cultivation. This great economy of time is also represented as available for seed-time, reaping, and carting in harvest.

The plough having broken up the land, a "comminutor," or rotary implement, is used, in character something like the Norwegian harrow, but driven at a high velocity. The inventor has succeeded in obtaining some remarkable results in reducing obdurate clay to a state of the finest tilth.

The soil having thus been brought to a higher state of cultivation than it is possible to produce even with spade-labour, there can be no difficulty in keeping it in that condition, for it will be seen that, by the guideway system of steam culture, the whole weight of the machinery, engines, and implements, rests upon the rails, and that nothing touches the soil except the implements in operation; no horses will poach the ground with their iron-

shod feet; the footprints of the guide and ploughman will nowhere be seen pugging the clay and treading into a solid clod that which has been reduced to the fineness of garden mould.

The destruction of weeds, earthing up, hoeing, and stirring the earth among growing crops, can only be performed at present during the earlier stages of the growth of the plant, and unless executed by hand-labour are always attended with difficulty, and more or less danger, from the impossibility of guiding the implements so as to operate in sufficient proximity to the plant, without running into and destroying some portions of the crop. By this system, however, Mr. Halkett is enabled to adjust the implements and cause them to travel at the requisite proximity to the rows at all times during the periods of the growth of the plant. In fact, to quote the inventor's language, "the hoes can be regulated to such a nicety that the operation may truly be called unerring."

All other operations, such as harrowing, clod-crushing, &c., are effected by the different implements being adapted to the same, or to some other cultivator, and these are lifted and lowered, and worked by the machinery. Independently of the machinery which carries the engines and implements, smaller ones are constructed for the purpose of carrying manure, the produce, water, &c. They are of the same width as the large one, from rail to rail, but much lighter and shorter, and the boxes or cart-bodies used are placed at either end, directly over the wheels, of which there are four, two on each side. These small carriages or trucks are drawn by the cultivator, and, when required, are furnished with tanks for the conveyance of water or liquid manure; and this may be distributed among the growing crops, either independently, or during the time when any of the other operations are in progress. For instance, the operations of stirring and distributing water, or liquid-manure, to the growing crops, may be performed simultaneously by one implement, in the form of a hollow bar or coulter, stirring the ground to a moderate depth, whilst the water, &c., passes out at the extremity of the bar. By this means the fluid is economised, on account of the evaporation from the surface being prevented; the soil is not caked, nor are the roots drawn to the surface in search of the moisture, afterwards to be injured by the parching of the ground.

The next important operation to be noticed is reaping, which is performed by a machine constructed on the principle of Bell's or Dray's, or it may be of any other good reaper. It is attached by suitable stays to maintain it at the proper level, perfectly independent of any support from the ground, and has the necessary gear for communicating the motion to the cutting-knives

and other parts of the machine by the steam-power; and the depositing of the crop, after cutting, is effected by a back delivery.

When manual labour is required for the purpose of weeding, transplanting, or any other light operation, the labourers are carried on to the ground by means of the trucks, upon which they sit or stand while the work is being performed, or while the crop is transferred from the ground to the truck, and by it taken away to the homestead. Thus even the injury resulting to the ground by men treading on it is obviated. These trucks may be propelled either by horses or by manual labour if desired.

Upon the question of cost, it may be too early to speculate with anything approaching to certainty; but, considering that a balance-sheet for a year might be required, Mr. Halkett has furnished two for farms of 1000 acres, and also one for a market garden of 50 acres.

Statement of a 1000 acre Farm on Guideways of creosoted Timber, at 10l. per acre.

Rail, capital, &c.:—

	Annual.
(a) Interest at 10 per cent., thus—	
Capital for rails, 10,000l.	
Interest on capital at 4 per cent.	£400
Repairs and renewals at 6 per cent.	600
	£1000

Farming capital, &c.:—

(b) Capital for stock, 2500l.	
(c) Locomotive cultivator, with 25 h. p. engines and shunting machinery complete, 1900l.; implements 300l., at 15 per cent.	£330
(d) Ten trucks 300l., at 8 per cent.	24
Coal at 20s. per day, and 250 days	250
Oil, &c.	10
Engine driver at 4s. per day, man 2s. 6d., boy 1s.	117
Five constant labourers	155
* Labourers for hand operation upon the crops	50
Farmer's annual field expenses	£ 936
Add interest for rails	1000

Cost of cultivation by steam £1936

Labour at homestead, expenses for marketing, and all other labour which is paid for as in the present system, need not be here alluded to.

* This item refers to such operations as hand hoeings and weedings, combined with the travelling machinery. Hand operations are in this manner more cheaply performed than they are at present. The above includes 250 acres weeded once, and 250 acres weeded twice.

Statement by Mr. W. REX, valuer to Messrs. CHINNOCK and GALSWORTHY, Land Agents, London, and a Farmer, for a Farm of 200 Acres, well tilled Land.

	Annual		
	£.	s.	d.
Capital:—8 horses, 4 ploughs, harrows, horse hoes, scarifiers, 2 waggons, rollers, 4 carts, 500 <i>l</i> .			
Depreciation of stock at 15 per cent.	75	0	0
Horse-keep, corn, 100 qrs., hay 30 tons	245	0	0
Labour, 4 carters, at 12 <i>s</i> . per week	£124	16	
One horsekeeper extra	31	4	
Three labourers	105	6	
	261	6	0
One hundred acres corn hoeing, 4 <i>s</i>	20	0	0
Cutting 50 acres of corn at 8 <i>s</i>	20	0	0
	621	6	0
Multiply by 5 for 1000 acres			5
	3106	10	0
Deduct	30	0	0
Farmer's annual field expenses for ordinary cultivation on the fourth or fifth shift system, exclusive of all extra labour for harvest, &c., but including all that can be done by the machinery in the field	3076 10 0		
Cultivation by steam			
	1936	0	0
Difference in favour of steam	£1140	10	0

Which is equal to 11 per cent. upon capital for rails, and, when added to 4 per cent. (already allowed), gives a profit of 15 per cent.

Rough gardening, in which the cultivation is on an extended scale, for the growth of potatoes, mangold wurtzel, cabbages, and sometimes corn, with its laborious and very costly culture, and its large cartage, will receive the same advantages.

A steam cultivator, like the small one above described, and of one-horse power, but capable of working for many more hours in the day than horses do, would cost 120*l*., two trucks would cost 60*l*., and all the implements 50*l*.; total 210*l*.. The wear and tear of this, at 15 per cent., would be 12*s*. 6*d*. per acre.*

* In the course of the discussion which arose at the meeting of the Society of Arts, after the reading of Mr. Halkett's paper, Mr. Alderman Mechi remarked, There could be no doubt that what had been done by the locomotive engine on railways, might in some degree be taken as an example of what was possible under the proposed system. They found that engines drew after them, at high velocities, trains of 200 tons, at a cost of not more than half-a-crown per mile for the working expenses. Might not a similar reduction of cost be hoped for in agricultural operations? If he had correctly understood Mr. Halkett, 10*l*. per acre was the cost of the wooden rails, and he (Mr. Mechi) believed they could be laid at that price. The interest of that, and the wear and tear, he would take at 15 per cent. He believed it was well understood that the cost of horse and manual labour upon a farm was something like 3*l*. per acre, as regarded the arable

BALANCE-SHEET (MARKET GARDEN).

In the following Table all the operations that are performed in the same manner in both systems, and therefore amount to the same cost, are not put down.

POTATOES AND COLLARDS—(1st Year).

	Cost on the present System, per Acre.				Cost by Steam, per Acre.		
	£.	s.	d.		£.	s.	d.
Trenching at 3d. per rod	2	0	0	...	0	10	0
Cartage of manure, 40 tons, exclusive of filling, &c.	0	10	0	...	0	5	0
Hoeing and earthing	1	0	0	...	0	4	6
Taking up	1	5	0	...	0	5	0
Collards, digging, 2d. per rod	1	6	8	...	0	6	0
,, hoeings	1	0	0	...	0	2	0
	£7 1 8						
Hand operations				...	0	5	0
						1	17 6
Interest on machinery				...	0	12	6
Depreciation, wear and tear of rails				...	1	0	0
						3	10 0

Advantage in favour of steam, say 3l. 10s. per acre.

11.—Seeds: their Mixture and Adulteration.

Attention has during the last year been prominently drawn to the fact of the large extent to which the adulteration of seed is practised by unprincipled dealers. It appears that Indian Rape seed and Radish seed are to be had in the market for 8s. or 9s. a bushel, for mixing with genuine turnip and other seeds worth

portion of the land. If 20 per cent. on that was saved by the plan now proposed, that would be 15s. on the 3l., which would pay for the interest of the rails. He also understood Mr. Halkett to say, that the cost of his machinery might be set against the ordinary cost of the horses and the usual farming implements, which he (Mr. Mechi) believed to be quite true." This view was controverted by other speakers; but the Chairman (Mr. Acland), in bringing the discussion to a close, said, though he came into the room with some prejudice against Mr. Halkett's system, and was even disinclined to take the chair, lest it should be regarded by his friends as an indication of his approval of the plan, yet he felt bound to say, that what he had heard that evening had led him to take a more favourable view, and to think that Mr. Halkett had opened questions deserving of serious consideration. If Mr. Halkett wished to win the agricultural mind to his plan, he must show what was the utmost amount of capital necessary to be invested, not only in the first outlay for the rails, but also in getting the whole system into operation. These were matters which the agricultural mind was apt to overrate, and which, on the other hand, the engineering mind had a tendency to underrate. For they knew very well that English engineers were ready to undertake anything, if the money was only found them. In the same way, he believed, the farmers were ready to adopt any change, if it was shown, not merely upon paper, but in the field, that it would pay them.

9d. and 1s. per lb. The 'Gardener's Chronicle' has fearlessly exposed this new species of imposition, and thus describes a sample of the Indian Rape seed which is employed for such dishonest purposes:—"In it we recognise besides, it may be, more than one sort of the genuine *Brassica*, to which belongs the rape, several sorts of the genus *Sinapis*, to which are referred the mustard,—and amongst them are, 1st, *Sinapis arvensis*, charlock, and *Sinapis nigra*, black mustard." It also enumerates "*Brassica campestris* (*B. rapa*), colza or rape seed," which, according to Mr. Bentham, grows on "borders of fields and waste places throughout Europe and Russian Asia;" and indignantly comments on the fact that such is the extent of adulteration, that not only can the untidy farmer sell his charlock seed at from 3s. to 4s. a bushel, but the English agriculturist is made to pay to the foreigner for similar rubbish at the rate of from 1d. to 1s. per lb.

12.—Adulteration of Linseed Cake.

Closely connected with the system of adulteration pursued with regard to agricultural seeds is the practice of mixing *Linseed* cake with foreign impurities. Mr. Robert Herbert, in an article entitled 'Statistics of Live Stock for consumption in the Metropolis,' which appeared in the Journal of the Royal Agricultural Society (vol. xix. part 2), gives some highly important information on this subject. He shows that, whereas the imports of linseed into the United Kingdom in the year 1841 were 363,461 quarters, in 1857 they had increased to 1,100,000 quarters; and he estimates the annual value at two millions sterling. The East Indian qualities are represented as being in general tolerably even, seldom varying to any appreciable extent at the respective ports of shipment. They yield the greatest quantity of oil, and, after pressure, the cake is no doubt more nourishing and valuable than any other. But the bulk of the supplies is furnished by other countries more subject to variations of climate, and uniformity of quality in different seasons is not obtainable. Inferiority in quality is usually accompanied by adulteration, a variety of seeds being found mixed with the linseed, such as wild rape (*Brassica campestris*), wild mustard or charlock (*Sinapis arvensis*), seeds of *Lolium perenne*, of dodder (*Cuscuta epilinum*), and of willow-weed and millet (*Panicum miliaceum*). The bulk of the linseed being imported from the Black Sea, the standard of quality and price is chiefly regulated by the importation from thence. In good seasons the Black Sea linseed is bold and pure, with only a small admixture of other seeds; and if the Greeks, in whose hands this article is now to a great extent centered, were not to tamper with it, the importation would leave little if any room for objection. Our brethren across

the Atlantic have studied the art of manufacturing linseed cake. What they produce is faultless to the eye, and, if not always perfection to the taste, it is thin, tender, flaky, and finds a ready sale in this country at the highest market-price of the day; the question of genuineness being left entirely for subsequent determination. A considerable quantity of the cake, which, owing to its tenderness, is now preferred for the feeding of sheep, is largely adulterated with bran. Thus the farmer has to pay 10*l.* or 11*l.* a ton for cake which pleases the eye in this country, but omits to consider that for this he has to pay dearly for the admixture of bran, which costs 4*l.* or 5*l.* a ton, and in the United States probably about half that price. The intrinsic value of linseed cake is not sufficiently dwelt upon; hard-pressed cake, or cake which is closely-ground, although genuine, is invariably refused by the farmer, and preference given to the more tender-looking but adulterated kinds.

13.—*Manufactured Cattle Food.*

The trade in manufactured cattle food appears to be largely on the increase—as well observed in the ‘*Gardener’s Chronicle and Agricultural Gazette*’ (October 25th, 1858):—

“There is a dishonesty of a different kind, no doubt, from that of the adulteration of manures, but against which the report of the chemical analyst is quite as safe a guard. It consists in charging a triple or quadruple price for the article pressed upon your notice, on the score of some imaginary merit which it does not possess. Thus a manure company, whose placards may be found in country places, charges —*l.* a ton for their fertilizer, on the score of its being economical, although its ingredients do not cost a quarter of the price, and are besides of very little value as manure. It is somewhat on the same principle that 40*s.* and 50*s.* a cwt. is charged for manufactured food, made, we readily admit, as good as it can be, but of ingredients which do not cost more than one-quarter or one-third as much.”

Mr. Lawes, of Rothamsted, has now come to the rescue with analyses and experiments leaving no doubt on the subject. In a recent number of the *Agricultural Society’s Journal*, he says:—

“In common with other agriculturists, I have been invited, by advertisements in the papers, by placards on the walls, and by circulars containing numerous testimonials from distinguished persons, to employ certain manufactured foods in the feeding of the animals on my farm. These foods frequently cost from 40*s.* to 50*s.* per cwt. Taking, for those for which it is given, the published average prices for the six weeks ending July 17th, 1 cwt. of the following stock foods would cost as under:—

1 cwt. Barley ..	..	..	..	..	..	8 <i>s.</i> 4 <i>d.</i>
„ Oats ..	..	..	..	..	..	9 2
„ Beans ..	..	..	..	..	..	9 4
„ Peas ..	..	..	..	..	..	9 6
„ Lentils ..	..	..	..	..	..	10 0
„ Oilcake ..	..	..	..	..	..	10 0
„ Linseed ..	..	..	..	..	..	16 6
„ Hay ..	..	..	..	..	..	4 0

"The manufactured foods thus cost, weight for weight, four or five times as much as the most nutritive of the ordinary stock foods on our farms. Very undeniable evidence of the superiority of the former should therefore be required, to induce the farmer extensively to employ them."

He then gives the composition of one of these foods, as ascertained in his laboratory. The figures stand as follow :—

Water	..	..	..	..	..	..	12·86
Nitrogenous substance	..	..	..	..	..	..	15·51
Fatty matter	..	..	..	..	..	..	6·22
Starch, sugar, &c.	..	..	..	..	..	..	55·97
Woody fibre	..	..	..	..	..	..	5·50
Mineral matter	..	..	..	..	..	..	3·94
							100·00

"Independently of the slight colouring with turmeric, and flavouring with cumin, anise, or other of the stimulating and carminative seeds used in cattle medicine, which these foods frequently exhibit, the constituents as here stated could be supplied by a mixture of barley-meal with some of the leguminous seeds enumerated, and oil-cake or linseed. Such a mixture, according to the prices quoted, could be prepared for about one-fourth of the price of the manufactured cattle food."

Mr. Lawes then refers to the general theory of nutrition, and to his own valuable experiments on the subject reported in previous numbers of the *Agricultural Society's Journal*. To the question why concentrated foods cannot be used in the production of animal growth as concentrated manures are used in the production of vegetable growth, he replies :—

"The answer is plain. In using the concentrated manufactured manure, containing a certain amount of nitrogen or phosphates, for example, the bulk of the crop is obtained from other sources—such as the atmosphere and water, not supplied by the farmer's hand; the natural constituents existing in his soil, and the residue from previous manures and crops. The application of a small quantity of ammonia and mineral matter will often yield as great an increase of vegetable produce as if 20 or 30 times the weight of farmyard dung had been employed. This is not to be wondered at when it is considered that by far the greater bulk of the dung consists of water and other constituents which the plant can obtain either from the air or the soil. We thus get, by the use of concentrated manures, a much greater weight of increased produce than there was of manure employed. The case is very different in the supply of food to our stock. The quantity of the constituents returned in the solid and liquid excrements, and in the increase of the animal, must invariably be very much less than was contained in the food consumed. No concentration of constituents, nor any amount of supply of some only, of those required for the respiration, the perspiration, the excrements, and the increase, can enable the animal to obtain a particle of what is requisite for these, from any other source than his food."

And he concludes thus :—

"From all that has been said, it will be clear that these newly manufactured foods cannot substitute any of the necessary constituents contained in our ordinary stock foods any further than they themselves supply them. So far as the mere supply of alimentary constituents is concerned, a mixture of

linseed or oil-cake, and corn-meal, can provide these at one-fourth to one-fifth the cost of the specially-made artificial foods. Such foods cannot therefore be relied upon as staple articles. The virtues which they really do possess over and above those which could be secured at one-fourth to one-fifth the price are confined, therefore, to the action on the health and digestion of the animals of the small amount of stimulating and carminative seeds which they contain. In fact, so far, they are sauce or medicine, rather than food. As such they are likely rather to increase than to diminish the appetite for further nutriment."

He candidly admits that they may, in their character of condiments—

"be of service in keeping horses in a more healthy state of body, or in aiding the digestive powers of weakly animals which do not readily consume or thrive upon the ordinary foods. It should, however, be clearly understood by the farmer that these manufactured foods cannot do away with the necessity for a given amount of digestible and assimilable constituents in the collaterally-consumed ordinary food."

In connexion with this subject, the following corroborative remarks were addressed by Professor Voelcker to the Royal Agricultural Society, at a monthly meeting, December 1st, 1858:—

"The uses of made-up cattle food have occupied my attention. The conclusion to which I am led by the analyses of three or four different samples of food of that description agree so entirely with the opinions expressed in Mr. Lawes's paper in the last volume of the Society's Journal, that I need not here enter into details to prove the fact that purchasers of such cattle food as that examined by me may readily procure equally nutritious and fattening food at something like one-fourth the cost at which such made-up cattle food is sold at present. Most samples of cattle food which I have hitherto examined contain large proportions of rice-meal (the refuse of rice-dressing mills), oat-dust, and the sweepings of flour mills, mixed with spoiled and inferior flour. The bad taste and fusty smell of the latter are concealed by strong-smelling drugs, such as fœnugric, or anise or fennel seed, and also by bitter substances, such as gentian. In one particular sample, much recommended as food for pigs, I have found the bulk of the meal to consist of crushed carrots, beans, rice, and barley-meal; this food also contained some sulphur and nitre, as well as fœnugric, and a little aniseed; and it was, in fact, a regular medical powder."

14.—*Artificial Manures. Guano: New Varieties.*

The importance of buying artificial manures by analysis only is strongly enforced by Mr. Clarke Sewell (Royal Agricultural Society's Journal, xlii. p. 278):—

"Science may have made its false steps, Lawes and Liebig may have differed, abstract theories may not always have borne practical fruits, but still chemical knowledge is the only way by which we can arrive at the real value of these artificial manures. Our practical ignorance cannot be bliss, unless it be pleasant to buy things at double their value, and lose good crops into the bargain. Farmers begin to see this, and a more healthy and rational feeling is coming over the manure market. A price being put on the most valuable parts of the manures, a buyer by analysis can readily see what his manure should cost, and a fee of 10s. to the Society's chemist will soon let

him know if the bulk equals the analysed sample.* The transactions in artificial manures have been long in coming to this simple plan; but, once established, the ignorant manufacturer who unintentionally fleeces his customers, and the rogue who purposely adulterates his manure, may consider their occupation to be gone."

In connexion with this subject it may be mentioned that attention has latterly been drawn to a new description of guano, termed phospho-Peruvian. It is very rich in phosphoric acid, which is found in it in a state more available for the use of plants than it is in bones and other phosphatic manures. When brought to this country it is subjected to a chemical process with sulphuric acid. Professor Voelcker has a very high opinion of it. He says:—

"Phospho-Peruvian guano being much richer in phosphates, and not containing so much ammonia as to cause too luxuriant a development of leaves at the expense of the bulb, is much superior to Peruvian guano as a manure for turnips, swedes, mangels, and potatoes; and I have, indeed, no hesitation in expressing the opinion that for root-crops the manure which I analysed is by far the most valuable fertilizer, whether natural or artificial, which as yet has been offered to the public."

It is said "to sustain in just proportions all the ingredients requisite for the rapid and healthy development of all our cultivated plants." Sombrero phosphate, so called from the most northern of the Caribbean Islands, from which it is obtained, also promises to be a valuable addition to those substances which are now used for the preparation of phosphates. A sample of it analysed by Professor Anderson yielded 77·90 of phosphates; whereupon he remarks that, "as a material for the manufacture of superphosphate, it is of much value, and, being sold at 5*l.* 10*s.* per ton, it is materially cheaper than bone-ash, which, if containing 79 of phosphates, would be sold for about 7*l.* 10*s.* per ton." It is, however, necessary to guard against confounding the true Sombrero Island guano with another substance bearing the same name, but a sample of which furnished a quantity of phosphoric acid equivalent to no more than 57·70 of phosphate of lime. Sombrero phosphate has lately engaged the attention of Dr. Cameron, in the Dublin Chemical Society, who makes the following remarks upon it:—

"It is said to exist in enormous quantities in the little island of Sombrero. It occurs as a soft, rather light, and easily pulverisable stone. A substance somewhat analogous to the Sombrero phosphate is met with on the Monk's Island (where the phospho-Peruvian is obtained); but, as it contains only phosphate of alumina, it is not, although existing in enormous quantities, imported for agricultural purposes, as it is generally believed that phosphoric acid, when in combination with alumina, is incapable of administering to the wants of vegetable life. As, however, Mr. Paul Sharward has recently shown the phosphoric acid which exists in soils is invariably combined with essquioxide bases (alumina or peroxide of iron), and never with protoxides

* This remark is equally applicable to the Bath and West of England Society.—Ed.

(lime or magnesia), it is more than probable that the phosphate of alumina in the Sombrero and Monk's Islands' minerals might be really available to plants without being even subjected to the vitriolising process. To say the least, it would be in the highest degree desirable to institute experiments with the view of testing the agricultural value of these substances when used *per se*."

15.—*Phosphate of Lime : its Effects on Cattle.*

Mr. William Wright, in an essay 'On the Management of Breeding Cattle,'* has the following remarks:—

"The use of phosphate of lime as manure, on a farm where the breeding of cattle is the chief object, is of great importance; for not only do the old but the young cattle prosper when a free use of bones is supplied either to grass or root crops. For many years the dairy farmers of Cheshire have been greatly benefited by the use of bone-dust, and I have found that, after such a dressing has been given to the grass-land, the cattle have been remarkably vigorous and healthy. Wherever impoverished, ill-looking animals are found, there is probably a want of this invaluable ingredient in the herbage. A dressing of ground bones, bone-ash, or superphosphate, is a necessary and important part of good and successful management. The quality of the hay or clover grown on land so dressed is much more valuable to the cattle than that grown with ordinary manure. This has been realised in a great degree on the Wold farms, on which large flocks of sheep are sustained where the land was before nearly useless; and on old sward lands, which seldom receive any manure except what the animals drop during the summer, the addition of a top-dressing of bones would be equally beneficial. A field of grass-land which had been exhausted, and which I found almost useless (the stock put into it hardly holding their own), after a dressing of 7 cwt. of ground bones per acre, carried one-half more stock, combined with great improvement in the state of the stock themselves, at the end of the summer. This outlay a tenant-farmer may safely make, as the return with profit is immediately before him. I know many prosperous farmers who act on this principle, and, if they do not use bones, keep double the stock and make up for what the land will not carry by a liberal use of corn or linseed cake. All grazing land is improved by the use of bones, and therefore it becomes an easy question of money value whether it be not profitable to graze, say at the rate of half a beast to the acre more by the use of bones, the cost price being for 7 cwt. of half-inch ground bones 2*l.* 9*s.*, which, lasting five years at the least, is on the average about 10*s.* per acre. Most graziers will admit that an outlay of 1*l.* is not likely to leave a loss for a summer's run for a bullock. My management, therefore, includes bone manure as indispensable when success and profit are looked for in keeping a herd of breeding cattle. The grass land in Holderness appears naturally to contain a fair proportion of phosphate, and is in consequence highly favourable for the rearing of calves; otherwise it would cease to keep so great a number of cattle, year after year, as it now does: little, if any, manure being applied."

16.—*Artificial Manures : their Effects on Permanent Meadow Land.*

From a report on this subject by J. B. Lawes, F.R.S., and Dr. J. H. Gilbert, in the Journal of the Royal Agricultural Society (vol. xix. p. 573), the following extract is made:—

* Journal of the Royal Agricultural Society of England, No. xlii., p. 511.

"In order that the more temporary or more rapidly-acting means of increasing the produce of meadow land may have their full effect, the more permanent means of amelioration that may be required—such as draining, marling, liming, and the like—must not be neglected. The application of bones is not recommended for general adoption. They appear to be chiefly adapted to the exhausted pastures of certain localities, and not to be generally applicable to meadow land which is mown for hay. The hay crop is a great exhauster of the mineral constituents of the soil, and these, owing to the high price of salts of potash, cannot, with profit, be fully restored in artificial manures. The return of the mineral constituents is better accomplished by means of farmyard manure, stable dung, night soil, and the like; which, at the same time, bring on to the land a more or less considerable quantity of available nitrogen. The best artificial manures for grass land are,—Peruvian guano, which is rich in phosphates as well as nitrogen; and nitrate of soda and sulphate of ammonia, which are rich in nitrogen, but contain, of course, no phosphates. Peruvian guano, when used alone, may be employed at the rate of from $1\frac{1}{2}$ to $2\frac{1}{2}$ cwts. per acre; nitrate of soda alone, or sulphate (or muriate) of ammonia, at the rate of $1\frac{1}{2}$ to 2 cwts. per acre. The salts of ammonia are, however, relatively too expensive to be employed largely with profit, and both ammoniacal salts and nitrate of soda are more advantageously used in combination with guano. A very generally useful top-dressing for the hay-crop may be made of three parts Peruvian guano, one part nitrate of soda, and one part sulphate of ammonia. Of this mixture, 2 to $2\frac{1}{2}$ cwts. per acre may be employed. With this applied annually, and the application of 10 or 12 tons per acre of poor rotten dung once every four or five years, a good crop of hay may be taken off every year without injury to the land. The best time of sowing the "artificial" manures is generally in January, and it should, at any rate, be seldom postponed beyond February."

17.—*Early Suggestion with regard to Cultivation by Steam.*

IN an interesting article on 'Patent Specifications relating to Steam Culture,' which appears in the Transactions of the Highland Society (No. 63, p. 574), it is stated that "the first patent in this important department of mechanism dates from a very early period—viz., January 17th, A.D. 1618. The subject of the patent which was granted to David Ramsay and Thomas Wildgoose, was for a 'Newe, apte, or compendious form or kind of engine or instrument, and other profitable invencons, wayes, and meanes, for the good of our commonwealth, as well to ploughe ground without horse or oxen, and to enrich and make better and more fertile as well barren peat, salt and sea land, as inland and upland ground.' To David Ramsay, one of the above patentees, were granted two other patents, one dated January 21, 1630, and January 29, 1634, from which it seems likely that he proposed to use the power of steam for the above purposes; for in the patent of 1630 the following sentence occurs in the claim made: 'To raise water from low pits by fire; to make every sort of mill to go on standing waters by continuall mocon, without the helpe of wind, water, or horse.'"

18.—*Early Mention of Cotswold Sheep.*

At a meeting of the Royal Society of Literature, on the 27th April, 1859, a paper 'On Merino Sheep' was communicated by Sir J. Boileau, Bart. In the course of his memoir, Sir J. Boileau demonstrated that, in very early times, English wool was in high repute on the Continent of Europe; and proved, from various Spanish writers, and chiefly from the letters of Gomez Cibda Real, that there was in early times an office in Spain, called the Judge of the Shepherds, which was usually conferred on men of high rank, and that one Migo Lopez di Orosco bore this title as early as 1339 A.D., a period when, the Spanish writer adds, "flocks were first brought in transport-ships from England into Spain." He then went on to show, from the Chronicles of Stowe for the year 1467, and from Baker's Chronicles for 1465, that Edward IV. gave licence "for certaine Cotteswolde sheep to be transported and sent into the country of Spaine, as a present to the King of Arragon,"—not improbably in consequence of a treaty between the two kings, which is preserved in Rymer's 'Fœdera,' vol. xi., p. 631. As was natural, sending of these sheep to Spain was not popular in England—the Chronicle adding, that these ewes and rams "did so multiply in Spain, as to have proved very detrimental to the woollen trade of England."

19.—*Utilisation of Sea-Weed.*

In the present age of competition, when the manufacturers of the North are turning all natural products to account, it becomes a matter for serious consideration, whether in the West of England, with its large extent of sea-board, there are no means of utilising the various *algæ*, or sea-weeds, which abound upon the coast. With this view a prize of 100*l.* has been placed at the disposal of the Council of the Society of Arts, in London, by Sir W. C. Trevelyan, Bart., to be awarded for 'The best Essay on the Applications of the Marine Algæ and their products, as food or medicine for man and domestic animals, or for dyeing and other manufacturing purposes.' Competitors must give the results of their original investigations on sea-weeds; and they must prepare a series of specimens illustrative of the best modes of collecting, preserving, and preparing the several species. Mere compilations will not be admitted to competition. The Essays, with accompanying specimens, must be sent to the Society of Arts by the 31st day of December, 1860. Each Essay to be marked 'Essay on Marine Algæ,' and to have a motto or distinctive mark attached, which mark must also be written on a sealed letter, containing the name and address of the

author. The letters containing the names and addresses of the authors will remain with the Society of Arts, and none will be opened except that bearing the motto or mark attached to the Essay to which the adjudicators award the Prize. Copies of the conditions may be obtained on application to the Secretary of the Society of Arts.

20.—*Sickles and Cycles.*

(TO THE EDITOR OF 'THE TIMES'.)

SIR,—After reading the comprehensive and masterly review of the monetary year, including the Harvest Report, which forms the City Article in 'The Times' of yesterday,* my attention was drawn, not for the first time, to a phenomenon in the past history of the corn-trade, which I have never had the satisfaction of seeing noticed in any public organ, agricultural or commercial, but which appears to me sufficiently remarkable to deserve to be known, and, if so, to occupy a small space in your columns. It is this:—For no less a period than thirty-two years—ever since 1827—the price of wheat in this country has moved in quadrennial periods—four years up and four years down—with a regularity so steady and invariable that it is difficult to cast one's eyes over the scale of "annual averages" and escape the impression it conveys of a perfect natural cycle. Such a circumstance would be less surprising to any one who had studied the constancy of Nature's operations, even in elements the most seemingly inconstant, were it not for the many and persevering attempts that we have seen (and happily outlived) to regulate by legislative mandates a tide whose ebb and flow has observed the same inevitable libration, unaltered and unaffected, through all the multiform attempts to "regulate the price of corn," from the date of Lord Glenelg's Act in 1828, through Peel's Acts, and still throughout the decennial period that has succeeded the abandonment of all Acts but the wise one of leaving it alone.

No expansion into verbal statement will do justice to the expressive tale which the diagram of annual prices affords to the eye. Briefly told, however, and omitting fractional figures, it is as follows:—From 1827 to 1831, the first quadrennial period, the prices of wheat rose from 58s. in the first-named year to 66s. in the last. Thence to 1835 it fell by regular annual steps, 58s., 52s., and 46s., to 39s. In the next four years it rose again with equal regularity, through 48s., 55s., and 64s., to 70s. in 1839. Then down by the gradations of 66s., 64s., and 57s., to 50s. in 1843. Up again, through 50s., 51s., and 54s., to 69s. in 1847. Down again, in turn, by the regular stages of 50s., 44s., 40s., to

* January 4th, 1859.

the figure, fearful to agricultural eyes, of 38s. in 1851. The next four years it mounted again by the encouraging degrees of 41s., 53s., 72s., to the Crimean altitude of 74s. in 1855; whence it has declined, in obedience to the same singular law of succession, to 69s. and 56s. in 1856 and 1857, and to the still lower figure it holds in the year just expired, the third, and happily the penultimate, of our present descending series.

From this statement (unavoidably tiresome and ineffective in the reading) any one caring to take the trouble can readily draw the diagram for himself, and observe the instructive, or at any rate, suggestive picture it furnishes. Whether in our anti-statistical farming-world the reflections it affords will be much valued, especially at this luckless moment of prospective declension augured by it for the coming year, I may well feel some question; but I am induced to think that in the eyes of the commercial world it may find some appreciation (*quantum valeat*) as a possible approach to the disclosure of "law" in a class of prices which, under the annual title of "The Harvest," affect and underlie so many interests, and interpenetrate so importantly the common wealth of all. And with such view I venture, by your permission, to submit it to the notice of your readers in this and other countries.

Your obedient servant,

Jan. 5.

C. WREN HOSKYNs.

21.—On Roofing for Farm-Buildings.

Primley Hill, Dec. 28.

DEAR ACLAND,—After the many and varied criticisms which were somewhat unsparingly passed by my friends, both in and out of the Council, on what they deemed the "novel and untenable ideas" advanced in my elementary paper on Agricultural Architecture, which appeared in vol. iv. of the Journal,—and especially after the sort of threat which was held, as it were, *in terrorem* over me by one of the most talented and scientific men amongst us, "*that I had not heard the last of it*"—I certainly did expect, and have anxiously searched each succeeding number for, this promised refutation of the *unpractical* (I had almost said the *unprofessional*) notions which were there enunciated.

As yet, however, I have waited and have looked in vain; nor am I aware that any notice has been taken of my paper, if I except the passing allusion to it which appears in the opening paragraph of the "Essay on Roofing," in vol. vi., in which Mr. Isaac broadly states, that I "*recommend farmers to study architecture in order to dispense with the services of professional men.*" Now this I look upon as the unkindest cut

of all, for it puts into my lips a statement *diametrically* the reverse of that which I did make (see vol. iv. p. 302), and proves that my paper could not even command the attentive perusal of the essayist, who could not, had he done so, have so entirely misrepresented my intentions. I, on the other hand, have read his essay, and that with care, and although in some points my practical experience does not run exactly in the same groove with his, I am quite prepared to say that, spite of its *professional* tinge, I consider it to be both useful and instructive; nay, I take his own figures and his own estimates of value as the basis of the comparison which I am about to draw between the cost of roofing of the ordinary construction and that of some on my own principle which has been recently erected.

Unlike those doctors who tell their patients "*to do as they say, and not as they do*," I will at once assert that I not only propound my nostrums, but *I TAKE them*. I have erected several roofs on the plans suggested in my elementary paper, and in no case yet have I had cause to regret that I did so, and of these I am about to give the actual *measurements* and *the cost* of the last and most simple one, in the hope that my *facts* may meet with more favour at the hands of the learned than did my theories.

The building in question is a cattle-shed, with a loft for bay and straw over. It is 40 feet long and 16 feet wide, in clear of the walls, and has a gable at either end. My roof consists of the following timbers:—

		In.	In.	
Ridge piece	..	4	× 6	} 44 feet long.
4 purlins, each ..	..	3	× 4½	
2 plates, each ..	..	4½	× 1½	
90	rafters, each	2½	× 1½	.. 14 feet long.

The covering is of slate. Each of the purlins and the ridge is trussed with an iron rod in the manner indicated at page 309, vol iv., and are thus rendered of sufficient strength to carry the whole weight of the roof from gable to gable, without the intervention of principals, or other support of any kind. The rafters are each notched into and firmly spiked to the ridge-piece from which they respectively *hang*, and the rigidity of which, from the trussing, entirely relieves the side walls from all weight and lateral pressure: to such an extent indeed as that their removal would in no respect injure the stability and equilibrium of the roof, which would remain unmoved, supported by the gables alone. The absence of ties of every kind economises that space in the roof, which in those of different construction is often to a great extent, if not entirely, lost; and the cost of the whole is given below, not as matter of theory, but from the actual bills paid, with the exception of the timber, the cost of which, and sawing, I am unable to separate from other work, and there-

fore assume at 3*s.* per foot, being Mr. Isaac's figure, and of which the quantity is as under :—

	Cubic Feet.
Ridge	7 $\frac{1}{2}$
Purlins	16 $\frac{1}{2}$
Plates	3 $\frac{1}{10}$
Rafters	42 $\frac{1}{10}$
	69

which, at 3*s.* per foot, gives 10*l.* 7*s.* The whole cost of my roof then is as follows :—

	£.	s.	d.
69 feet of timber	10	7	0
Blacksmith's bill	3	17	6
Carpenter's ditto	1	8	0
	£15	12	6

for 12 $\frac{1}{2}$ square of roofing, or 25*s.* a square ; whereas, according to Mr. Isaac's plans and estimates, the *lowest* figure will be found to be 3*l.* 4*d.*, and all the others range between 37*s.* and 42*s.*, whilst they afford in most cases less convenience, and in point of actual strength are not superior, if indeed they equal that of the roof which I have above described.

And now, as I wish my statement to be as practical and as concise as possible, I will add nothing to the above *facts*, beyond the expression of the pleasure it will at all times give me, to allow my buildings to be inspected, whether for criticism, or as examples to be copied and improved on ; certain as I am that in the one case they will not belie my statement, and equally sure that in the other those who adopt my principle will find the advantage which I myself have done, and which I desire should be extensively enjoyed by others. One request only I have to make of those who may be induced to criticise—viz., that “they set down nought in malice, nor aught extenuate,” but judge me and my suggestions fairly, and I have no fears for the result.

J. BELFIELD.

22.—*Journal of the Royal Agricultural Society of England*,
Vol. XIX., Parts 1 and 2. London : J. Murray.

THE *Journal* for the year now closing contains twenty-six articles in various departments of agricultural literature. Among the contributors are the well-known names of Lawes, Gilbert, Voelcker, Read, Tanner, Morton, Henfrey, Wright, Coleman, and Thompson. In preceding pages of this *Journal*, extracts have been made from several of the more important papers. Our present notice will be confined to a description of the general features of the work rather than to a criticism of the con-

tents. Mr. Dixon, in his prize essay, 'On the Management of Grass Lands,' contributes some useful information. He states that for the last twenty years he has had rather extensive opportunities of examining the results from the use of bones, and he has "no hesitation in pronouncing them to be pre-eminent above all other manures for the improvement of grass lands, when permanency as well as cost are considered." He illustrates his remarks by reference to many examples, chiefly derived from the Northern and Midland counties, and manifests a disposition to give a candid consideration to the merits of other fertilisers. The same subject is treated of by the Rev. W. R. Bowditch, who adds much statistical information; and Mr. H. S. Thompson, in a paper 'On the Laying-down Land to Grass, and its subsequent Management,' draws attention to the fact that little if any more grass is now produced in England than was grown fifty years ago. For this result, he believes one of the chief reasons to be, that—

"The returns from capital laid out in the improvement of grass land do not come so directly into the pocket as those from corn, and are apt, therefore, to be underrated or lost sight of. Few farmers sell hay; and if by more liberal treatment of their meadow land the hay-stack increases in size, so as to effect a saving in horse-corn, and bring the store cattle into the pastures in spring in a more healthy and thriving state; or if the improvement made in a poor pasture enable the occupier to rear more young stock, and in better condition; still the return on the outlay is mixed up with other questions, such as the market price of lean and fat stock at the times of sale and purchase, and it becomes extremely difficult to separate it from the general profit-and-loss account of the whole farm. In short, the farmer does not put the money derived from the improvement of the grass land directly into his pocket, and he is therefore not very sure whether what he lays out in this way ever finds its way back or not. The result of a doubt on such a question it is not difficult to foresee: so the grass land has to content itself with what the half-starved cattle are compelled to leave behind them, added to a liberal allowance of atmospheric advantages; and its continued poverty is a standing proof that these resources are not of the richest, and will not bring us any nearer to the *two blades of grass*."

The writer then enlarges on the fact, that the great blot which disfigures British agriculture at the present day is "the neglected state of so large a portion of the grass land," and proceeds to detail the results of his own experience in laying down grass land. These are unfortunately too long for quotation; but it may be useful to remark that, as a general rule, he recommends that where *quantity* of grass is required, *guano*, *nitrate of soda*, *soot*, or other *ammoniacal* manure should be used; but, where *quality* is an object, recourse should be had to *lime* or *bones*. In conclusion, he states his decided conviction, as "the result of twenty years' experience, that money judiciously laid out in the improvement of grass land brings in a more certain return than when expended in the growth of corn." The paper on 'Recent Improvements in Norfolk Farming,' by Mr. Clare Sewell Read,

contains the statement, that "the Norfolk or four-course shift is going out of favour in its native county," and that "the very commendable practice of forking out couch in the stubbles, directly after harvest, is fast increasing." The following extract, bearing on a subject which, it is believed, has very beneficially engaged the attention of the Council of the Bath and West of England Society (as will be seen on reference to the 'Proceedings' at the latter end of this volume), is too apposite to be omitted from these pages:—

"There is one progression which cannot be regarded as an improvement, and that is the increased value recently put upon a tenant's covenants. Covenants in Norfolk are understood to be the hay, roots, &c., that one tenant leaves on a farm at Michaelmas, and which his successor takes at a valuation. There is no fault to find with the principle of these valuations: it is the simplest and best which is employed in any county. The roots, as well as the hay, are valued at what they are worth, not at what they have cost for ploughings, manurings, and the like. The incoming tenant pays for the thrashing of the corn-crop and delivers it, taking the "straw, chaff, and carvings" (in Norfolk "colder") in return; but the covenant prices of hay and roots have become so high, that for these and the clover seeds the incoming tenant on good land has to pay as much as 50s. per acre on his entire farm, and the occupier of lighter lands in similar proportions. A great deal of hay has been valued within the last three years at 4*l.* 4s. per ton, and swedes at 6*l.* per acre. The only portion of the Norfolk covenants which is really worth the price paid for it is a good crop of mangold wurtzel. This may weigh 30 tons per acre, and would be valued at 7*l.*; but, before this crop is used, there is a serious outlay on it. It has to be pulled, topped, loaded, carted, stacked, thatched, banked, uncovered, trimmed, and carted again, before the roots are ready for the stock. It would be a great improvement if the tenancies of farms commenced at *New* instead of *Old* Michaelmas. A fortnight at that season is invaluable to the new tenant, and the old one has literally nothing to do."

The report by Mr. Wright on 'The Exhibition of Cheese at Chester in July, 1858,' contains matter of interest; but as it is admitted that several of the best makers declined, for prudential reasons, to exhibit, it may be questioned if the true condition of the cheese manufacture was determined. On two important points—1. the heat of the milk at the time of mixing for coagulation; and 2. the quantity of salt applied to the curd—the information given to the judges was so conflicting and uncertain, that little value can be attached to it.

The paper on 'Liquid Manure,' by Professor Voelcker, is a valuable contribution to agricultural chemistry; but from its nature defies compression, whilst a mere abstract would be comparatively useless. The same remark applies to an elaborate report by Dr. Voelcker on a series of 'Experiments on Swedes, with remarks on Manures employed.' The practical conclusions of Mr. Lawes and Dr. Gilbert with regard to 'Different Manures on Permanent Meadow Land' will be found in another part of

these pages. The scope of a paper by Mr. J. C. Morton, 'On the Cost of Horse-Power,' will, in the absence of details, be best described in the following extract:—

"The cost of horse-power is a subject of particular interest just now when steam-power, in its various agricultural uses, is being declared the cheaper of the two; and it is worth while in the first place to consider their relative positions. . . . Steam cultivation will, no doubt, ultimately be adopted altogether, irrespectively of narrow differences of cost per acre: it will lead to deeper and more thorough tillage, to great economy of time, to greater promptitude, activity, and skill in labourers; and these are sufficient security for its adoption and extension, whether it cost a shilling more or a shilling less per acre, than the present ordinary system of farm management. But it is plain that a decision of the narrow question of immediate cheapness cannot be made by comparison of actual cost on one side with mere 'estimate' upon the other. Professor John Wilson, one of the judges to whom the Chester award is due, has indeed since declared as much in a lecture on this subject to students of agriculture in the Edinburgh University. He has stated, what is obviously true, that no decisive comparison is possible until we have ascertained the actual cost of each per cwt. of draught at a given rate of movement.

"The object of the present paper is to give the materials of such a calculation, as they are furnished by the experience of some of the best farmers in the country. Certainly, at present, the statement of the agriculturist on the one side of the subject is most indefinite and vague, when compared with that of the engineer upon the other. The latter gives the result of his observations and his calculations to the third place of decimals; the former is too often content with an unsupported declaration of opinion. The farmer, no doubt, has to deal with more inconstant and indefinite particulars than the mechanic; but his experience can be recorded with equal accuracy, and, when for long enough, will furnish data for as detailed a calculation."

23.—*Report of Experiments on Killerton Farm.*

By T. D. ACLAND, Junr.

(Continued).

1. As to *wheat on special soils*, I have no report to make.
2. The following table records an experiment *with barley (after swedes*, as recorded in vol. vi. p. 350):—

The cross dressings from N to S on the lines B, D, F, H, K, were sulphate of ammonia, nitrate of soda, and guano, as before: the columns 1, 3, 5 were to have received phosphate; columns 2 and 4 were to have no phosphate; but my gardener tells me he did not apply any phosphate at all last year. At any rate, column 4 *has never had any phosphate*, the plots marked O no nitrogen, and the plots marked OO have had no *manure* of any kind for the last five years. A glance will show how little difference the want of phosphate in column 4 has made, and how decided has been the effect of the nitrogenous manure.

The

Size of the Spots
B, D, F, H, K,
8 perches, or
1/10th of Acre; the
others 4 perches.

Report of Experiments on Killerton Farm.

EXPERIMENTAL FIELD.

See Journal Vol. IV. p. 227, Vol. V., p. 351, Vol. VI., p. 351.

(Crop, Swedes, 1857, Barley, 1858.)

E
N
W
Produce
perches
perches
nately 1/2

	1.	2.	3.	4.	5.	
A	lbs. 54 Straw. 49 Corn. 7 Chaff.	lbs. 52 Straw. 45 Corn. 6 Chaff.	lbs. 52 Straw. 44 Corn. 6 Chaff.	lbs. 47 Straw. 44 Corn. 6 Chaff.	lbs. 46 Straw. 41 Corn. 6 Chaff.	No Dre Corn 22
B	lbs. 123 Straw. 117 Corn. 14 Chaff.	lbs. 129 Straw. 128 Corn. 17 Chaff.	lbs. 147 Straw. 138 Corn. 22 Chaff.	lbs. 111 Straw. 104 Corn. 16 Chaff.	lbs. 113 Straw. 107 Corn. 17 Chaff.	Cross-Dr 56 lb. 8s Corn 59
C	lbs. 81 Straw. 56 Corn. 7 Chaff.	lbs. 54 Straw. 47 Corn. 5 Chaff.	lbs. 50 Straw. 44 Corn. 6 Chaff.	lbs. 44 Straw. 39 Corn. 5 Chaff.	lbs. 37 Straw. 33 Corn. 5 Chaff.	No Dre Corn 19
D	lbs. 190 Straw. 152 Corn. 20 Chaff.	lbs. 161 Straw. 139 Corn. 18 Chaff.	lbs. 158 Straw. 131 Corn. 17 Chaff.	lbs. 146 Straw. 124 Corn. 16 Chaff.	lbs. 136 Straw. 118 Corn. 17 Chaff.	Cross-Dr 56 lb. 11s Corn 60
E	lbs. 56 Straw. 51 Corn. 7 Chaff.	lbs. 53 Straw. 48 Corn. 6 Chaff.	lbs. 51 Straw. 49 Corn. 6 Chaff.	lbs. 48 Straw. 47 Corn. 5 Chaff.	lbs. 36 Straw. 37 Corn. 5 Chaff.	No Dre Corn 23
F	lbs. 165 Straw. 133 Corn. 21 Chaff.	lbs. 156 Straw. 141 Corn. 17 Chaff.	lbs. 140 Straw. 128 Corn. 18 Chaff.	lbs. 123 Straw. 126 Corn. 15 Chaff.	lbs. 110 Straw. 94 Corn. 12 Chaff.	Cross-Dr 56 lb. 1s Corn 62
G	lbs. 59 Straw. 58 Corn. 7 Chaff.	lbs. 58 Straw. 58 Corn. 7 Chaff.	lbs. 51 Straw. 50 Corn. 6 Chaff.	lbs. 45 Straw. 48 Corn. 7 Chaff.	lbs. 40 Straw. 38 Corn. 6 Chaff.	No Dre Corn 21
H	lbs. 153 Straw. 131 Corn. 22 Chaff.	lbs. 154 Straw. 138 Corn. 17 Chaff.	lbs. 145 Straw. 129 Corn. 19 Chaff.	lbs. 127 Straw. 116 Corn. 18 Chaff.	lbs. 134 Straw. 118 Corn. 17 Chaff.	Cross-Dr 56 lb. 8s Corn 61
I	lbs. 37 Straw. 33 Corn. 4 Chaff.	lbs. 48 Straw. 46 Corn. 5 Chaff.	lbs. 43 Straw. 43 Corn. 5 Chaff.	lbs. 44 Straw. 41 Corn. 4 Chaff.	lbs. 43 Straw. 38 Corn. 5 Chaff.	No Dre Corn 17
K	lbs. 157 Straw. 128 Corn. 19 Chaff.	lbs. 160 Straw. 133 Corn. 19 Chaff.	lbs. 161 Straw. 132 Corn. 15 Chaff.	lbs. 160 Straw. 131 Corn. 20 Chaff.	lbs. 161 Straw. 129 Corn. 14 Chaff.	Cross-Dr 56 lb. 11s Corn 61
L	lbs. 51 Straw. 37 Corn. 6 Chaff.	lbs. 60 Straw. 47 Corn. 6 Chaff.	lbs. 66 Straw. 55 Corn. 7 Chaff.	lbs. 65 Straw. 43 Corn. 6 Chaff.	lbs. 57 Straw. 33 Corn. 5 Chaff.	No Dre Corn 21
	Bones and Sulphuric Acid, 1857.	Bones and Muriatic Acid, 1857.	Ordinary Superphosphate, 1857.	No Phosphate for 4 Years.	Concentrated Superphosphate, 1857.	
	Corn . . lbs. 661	Corn . . lbs. 679	Corn . . lbs. 658	Corn . . lbs. 601	Corn . . lbs. 566	Produce perches with N
	283	299	285	262	217	Produce perches without gen.
	944	970	943	863	783	Total Cult

The spots O O (absolutely unmanured) being 4 perches, average 44lbs. of corn, or about 36 bushels to the acre, allowing 48lbs. to the bushel.

The spots with nitrogenous manure being double the size (or 8 perches) average about 127lbs. of corn, or, on same calculation, about 52 bushels per acre. The difference in the previous treatment as to phosphates makes no difference from which any conclusion can be drawn.

The effect of the guano is about the average of increase that of the sulphate of ammonia is below, and that of the nitrate of soda above the average of increase.

The field is now sown with mangold. The nitrogenous cross-dressings as before; two of the long columns with phosphate, one with phosphate and salt, and two with no mineral manure.

24.—*On the Meteorology of the South-West of England, 1857-8.*

By NICHOLAS WHITLEY.

THE warm month of September 1857, was followed by a great fall of temperature in October. The south-west wind brought a very heavy downfall of rain, which pervaded the whole of the south coast of England, and extended to Greenwich, where nearly double the usual quantity fell, affording a good illustration of the manner in which a sudden fall of temperature, combined with westerly winds, deluges the land with rain, and greatly interferes with the Autumn tillage.

An easterly wind prevailed in November, driving back the humid air of the Atlantic and bringing fine dry open weather. December was a fine, dry, warm month—the mean temperature of which, from the prevalence of gentle westerly winds, was equal to the mean of the whole year. A gentle westerly wind will equalise the temperature in a remarkable manner, the thermometer marking 53° by day, and 50° by night; but after a heavy gale from the south-west, which brings the warmer air from the middle of the Atlantic over the land, the thermometer stands as high as 57° by day, and 55° by night. How far this high temperature penetrates eastward, is an interesting problem yet unsolved.

The new year opened with continuously fine and mild weather, with a high barometer, and much open sunshine, and February and March were somewhat below their normal temperature; and both April and May were likewise deficient in heat; at the latter end of May there was a rapid rise in the temperature, and June was a very hot and dry month throughout; the wheat plant enjoyed a warm and calm season for blossoming, and came rapidly
into

TABLE I.—Showing the Mean Temperature of each Month for the Places mentioned, 1857-8

Names of Places.	Height above the Sea.	Oct.	Nov.	Dec.	Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.
		feet.												
Greenwich (mean of 35 years)	159	50.4	43.6	39.4	49.4	36.5	38.8	42.0	46.8	53.7	59.7	62.5	61.9	57.3
Truro (mean of 10 years)	55	51.1	47.1	43.8	51.1	42.8	43.7	44.6	48.6	54.1	58.8	60.1	61.1	57.7
1857.														
Truro (Royal Institution)	55	55.0	49.0	49.3	52.5	43.8	42.0	43.7	49.2	51.7	60.0	59.2	60.0	59.6
Scilly Isles	..	57.2	52.0	51.4	54.9	46.5	45.2	47.0	52.9	54.8	64.1	62.7	63.8	62.8
Guernsey	123	55.8	50.9	48.6	..	42.7	41.0	43.0	48.4	50.0	58.4	57.8	60.1	60.1
Exeter	140	54.4	48.1	48.6	..	41.6	39.5	43.1	48.7	52.8	62.0	60.8	62.0	60.9
Barnstaple	..	..	..	..	..	42.0	40.2	43.9	49.1	52.7	61.3	59.2	61.6	61.3
Otterhead	..	51.8	45.4	42.2	49.4	38.2	36.2	40.3	47.2	50.9	60.8	58.3	58.5	58.8
Ventnor	150	57.4	50.8	49.2	..	42.9	40.6	44.1	49.8	52.7	63.5	60.9	62.9	60.9
Clifton	228	52.4	44.9	46.7	..	38.5	36.0	41.2	46.9	51.3	61.5	58.6	60.8	58.9
Oxford	210	51.8	45.2	45.0	..	37.6	34.7	40.9	46.6	51.0	63.0	..	..	..
Greenwich	159	52.9	45.8	45.1	..	37.5	34.6	41.4	46.2	51.7	64.9	60.6	62.0	60.3
Norwich Priory	39	53.2	47.4	44.4	..	..	..	..	45.4	51.4	64.4	60.4	61.7	59.8
York	50	50.8	46.9	44.8	..	..	..	..	45.0	49.3	60.7	56.8	58.6	55.4
Isle of Man	..	52.7	47.0	48.9	..	..	..	..	43.6	49.3	56.0	59.1	58.0	56.5

TABLE II.—Showing the Depth of Rain in Inches for each Month at the Places mentioned, 1857-8.

Names of Places.	Height above the Sea.	Year.	Dec.	Nov.	Oct.	Sept.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.
Greenwich (mean of 34 years)	159	24.78	2.02	2.53	2.67	2.40	1.68	1.58	1.61	1.73	1.96	1.83	2.37	2.40	2.40
Truro (mean of 10 years)	55	44.08	4.90	6.11	4.08	3.68	4.66	3.79	3.44	2.54	2.41	2.79	2.64	3.04	3.68
1857.															
Truro (Royal Institution)	55	40.7	1.9	3.4	6.4	3.4	0.6	3.6	0.7	5.5	2.3	0.5	3.8	2.7	3.4
Scilly Isles	..	28.8	0.7	2.0	4.6	2.0	1.1	3.3	2.6	3.0	2.1	1.1	4.1	1.6	2.5
Guernsey	123	..	1.3	3.8	5.7	3.8	1.0	1.4	2.1	1.7	1.9	0.6	3.1	0.8	2.6
Exeter	140	..	1.1	2.1	6.2	2.1	0.5	1.6	2.0	6.0	2.9	1.2	2.5	0.9	3.1
Barnstaple	..	..	..	..	..	..	1.6	0.8	1.2	4.6	3.3	1.7	3.2	1.9	3.9
Otterhead	..	39.5	1.8	1.6	6.3	1.6	1.2	2.6	1.6	5.0	2.9	0.8	3.3	2.9	3.1
Ventnor	150	..	3.9	3.8	5.8	3.8	1.5	1.4	1.3	2.9	1.6	1.2	3.1	1.6	2.1
Clifton	228	..	1.1	1.7	3.3	1.7	1.0	1.2	1.1	2.9	2.5	2.0	1.7	1.7	3.3
Oxford	210	..	0.7	1.6	4.5	1.6	0.7	0.8	0.5	3.6	2.3	1.6	..	..	..
Greenwich	159	..	0.5	1.3	4.2	1.3	0.7	1.7	0.9	2.4	1.8	1.2	2.9	1.6	0.9
Norwich Priory	39	..	0.4	1.5	2.8	1.5	..	..	..	1.5	2.0	1.0	3.8	2.4	0.8
York	50	..	0.3	1.1	1.2	1.1	..	..	..	1.2	1.7	0.9	2.6	3.4	3.3
Isle of Man	..	..	1.6	2.6	3.5	2.6	..	..	..	3.2	2.2	2.7	3.5	2.2	4.1

into ear about the middle of the month. The temperature fell during July with a heavy gale, and much rain on the 26th and 27th; the potatoe blight immediately appeared, the apple trees were blighted, and much fruit blown down. August was almost continuously warm and fine, the harvest commenced and was general in the first week, and was gathered in under most favourable weather.

The wheat crop must be considered as above the average yield, but the sudden and great rise of temperature in June, with a very small amount of rain in that month, injuriously affected the late-sown spring corn, drawing it fast into ear with a weak and thin stalk; the turnip crop also suffered much from the same cause, but mangold braved the variations of heat and moisture, and showed a vast superiority in withstanding the variations of our climate, as compared with the turnip. The hay crop suffered in quantity from the drought, but it was gathered in excellent condition.

The practical lesson which the meteorology of the year teaches, is, that late-sown spring corn is often from climatic influence a very defective crop; the remedy for which appears to be deep autumnal cleaning of the land, and drilling it up during the winter: it is thus placed in good condition to receive the seed on the first burst of spring, so that the roots may spread and take fast hold of the soil, and the plant, having a vigorous growth, throws up a strong stalk and a well-filled ear.

Greater attention has lately been paid to develop the growth of cattle when young, and a corresponding benefit has resulted to the breeder. Let our corn plants receive like attention in the early stages of their growth, and they will push their way through many adverse influences to a bountiful harvest.

Truro, May 20, 1859.

25.—*Tithe Commutation Table.*

Communicated by R. Dymond, Exeter.

THE average prices of corn upon which the commutation of tithes was founded, as provided by the 'Act for the Commutation of Tithes in England and Wales,' were,—

		<i>s.</i>	<i>d.</i>	
Wheat	.. .. .	7	0½	per imperial bushel.
Barley	.. .. .	3	11½	,,
Oats	.. .. .	2	9	,,

By the 'London Gazette' of January, 1859, it appears that the average prices for the seven years ending on the Thursday next preceding Christmas Day, 1858, have been as follows:—

	s.	d.
Wheat	7	4 per imperial bushel.
Barley	4	5½ „
Oats	3	0½ „

And by calculation it will be seen that for every 100*l.* of tithe rent-charge, as stated in the apportionments, the amount payable for the year 1859 will be 108*l.* 19*s.* 6½*d.*, which is a little more than 3 per cent. above the last year's value, and an increase of 9 per cent. on the averages adopted for the apportionments.

The following statement, founded on Mr. Willich's 'Annual Tithe Commutation Tables,' shows that the average prices for the whole twenty-three years since the passing of the Tithe Commutation Act are 99*l.* 8*s.* 9½*d.*, being 11*s.* 3*d.* per cent. under those on which the commutation was founded. But notwithstanding the present low price of wheat, the rent-charge payable for the year 1859 will be considerably higher than at any previous period:—

			£.	s.	d.				£.	s.	d.
For the year	1837	..	98	13	9½	For the year	1851	..	96	11	4½
"	1838	..	97	7	11	"	1852	..	93	16	11½
"	1839	..	95	7	9	"	1853	..	91	13	5½
"	1840	..	98	15	9½	"	1854	..	90	19	5
"	1841	..	102	12	5½	"	1855	..	89	15	8½
"	1842	..	105	8	2½	"	1856	..	93	18	1½
"	1843	..	105	12	2½	"	1857	..	99	13	7½
"	1844	..	104	3	5½	"	1858	..	105	16	3½
"	1845	..	103	17	11½	"	1859	..	108	19	6½
"	1846	..	102	17	8½						
"	1847	..	99	18	10½				23)	2287	2 0½
"	1848	..	102	1	0						
"	1849	..	100	3	7½						
"	1850	..	98	16	10	General average for					
						23 years }			£99	8	9½

26.—Average Prices of Meat and Corn.

Compiled from the Journal of the Statistical Society. By R. DYMOND, Exeter.

Average Price of Beef and Mutton per Pound and per Stone of 8 lbs., as sold by the Carcase in Leadenhall and Newgate Markets.

	Price per Pound, for 3 Months, ending				Price per Stone, for 3 Months, ending			
	Dec. 1857.	Mar. 1858.	June, 1858.	Sept. 1858.	Dec. 1857.	Mar. 1858.	June, 1858.	Sept. 1858.
BEEF—inferior ..	d. 4½	d. 4½	d. 4½	d. 4½	s. d. 2 10	s. d. 2 10	s. d. 2 10	s. d. 2 10
„ middling ..	5½	5½	5½	5½	3 7	3 6	3 5	3 6
„ best ..	6½	6½	6	6½	4 4	4 2	4 0	4 2
MUTTON—inferior	4½	4½	4½	4½	3 0	3 2	3 0	3 0
„ middling	5½	5½	5½	5½	3 10	3 11	3 8	3 8
„ best ..	7	7	6½	6½	4 8	4 8	4 4	4 4

Average Price of Grain per Imperial Quarter in England and Wales during each Quarter, for the Year ending September 25, 1858.

	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Average for the Year 1857 ..	56	4	42	1	25	0	38	3	43	0	41	4
Quarter ending—												
December 26, 1857	52	0	40	1	24	7	34	11	43	7	42	8
March 27, 1858	46	5	36	6	22	9	32	7	38	8	40	6
June 26, 1858	44	1	34	7	25	5	31	6	40	9	42	3
September 25, 1858	44	7	32	6	26	10	33	2	45	3	44	1

Wheat sold in England and Wales during each Quarter, for the 12 Months ending September 30, 1858; and also the Quantities entered for Home Consumption.

	Sold in England and Wales.	Entered for Home Consumption.
	Quarters.	Quarters.
Quarter ending December 31, 1857	1,313,000	1,242,000
„ „ March 31, 1858	1,294,000	840,000
„ „ June 30, 1858	1,208,000	1,125,000
„ „ September 30, 1858	1,264,000	1,070,000
	5,079,000	4,277,000

UNIVERSITY LOCAL EXAMINATIONS.

 OXFORD UNIVERSITY: EXAMINATION AT EXETER;
 DISTRIBUTION OF PRIZES.

THE subject of Middle Class Education is familiar to the members of the Bath and West of England Society. In the 'Journal' of last year (vol. vi. p. ix.) attention was drawn to the fact that a test of "good general education" had been offered to the whole of England, under the conduct of Examiners especially appointed by the Universities of Oxford and Cambridge, and that the scheme for "local committees to co-operate with these examiners," first inaugurated in the West of England by an agricultural body, had been followed by the appointment of similar committees in the great centres of population—Liverpool, Manchester, Leeds, Birmingham, Bedford, London, Southampton, Cheltenham, and Bath.

The local examinations at Bath and Exeter commenced, simultaneously with those at the other centres, on the 21st of June, 1858, and continued till the 26th. At Bath the University was represented by Mr. Thomas Dyke Acland, D.C.L., as delegate, and Rev. G. S. Ward, M.A., as examiner. At Exeter the University delegate was the Rev. Robert Scott, D.D., Master of Balliol, and the Examiner, Mr. Parker, M.A. The results of the several examinations were published officially by the University of Oxford, and extracts from the report will be found in another portion of this volume.

The Exeter Examination revealed a state of facts creditable to many of the instructors of youth in the counties of Devon, Somerset, and Cornwall, and was deemed satisfactory by the committee of gentlemen who, in the year 1857, were charged with the duty of carrying out the "scheme of prizes for practical schools in the West of England." To mark the success of the movement and give it additional impetus, it was thought desirable that local prizes should be awarded to those pupils who had distinguished themselves in the examination. A public meeting was accordingly held at the Guildhall, in the city of Exeter, on Friday, October 22, to which the students, their parents, and instructors were invited. In the unavoidable absence of Sir John Kennaway, Bart., President of the Committee, the chair was taken by the Right Hon. Sir J. T. Coleridge, Kt., who briefly introduced the business of the meeting, and called on Mr. Acland, Honorary Secretary to the Exeter Committee, to

read the report of their proceedings. From this document the following is an extract :—

“The Committee think that the necessary expenses of a local examination under the authority of the University will require a fund of about 50*l.* annually, in which estimate it will be observed that no allowance is made for prizes, if they should be deemed desirable.

“In London, where the Local Committee was composed chiefly of practical teachers, each candidate examined in the rooms engaged by the Committee was required to pay 10*s.*, the candidate having the alternative of paying his travelling expenses to Oxford. It may be premature to decide on taking a similar step at Exeter; but the Committee are of opinion that eventually the local examination ought to be self-supporting.

“The position of the Exeter candidates in the Oxford division list is a ground of congratulation to the promoters of a scheme which had Exeter for its birthplace. It deserves particular notice that not only some of the highest places of honour were attained by candidates from the West, but that the average of attainment of Exeter candidates in the most important branches of education was very much above the average for the whole of England in the same departments, fully justifying the confidence expressed last year by your secretary, in concert with Dr. Temple, that the schoolmasters in the West of England need not fear comparison with their brethren in any part of the country. The candidates, at the recent examination, were not drawn from schools of any particular class. Grammar schools, of very high reputation, and commercial schools strove side by side in honourable competition.

“But the Committee feel especially bound to advert to the fact that several schools which competed, in some cases with success, in the first Exeter examinations of 1857, supplied no candidates in 1858. Whether this result was owing to the fear of too high a standard, to the fee to be paid, or to any other cause of misapprehension, there is reason to believe that it was not owing to any apathy among the masters.

“But the facts of the case suggest the enquiry whether the Oxford examinations have superseded the demand for some local examination, ancillary or in some sense introductory to the Oxford examination, for the sake of such schools as responded warmly to the original proposals of 1857, while they have hesitated to accept the overtures of the Universities.

“The Committee are not prepared at present to announce any distinct proposal for the continuance of a purely local examination, should such be declared desirable, but they wish it to be distinctly understood that they have not lost sight of the primary object which they were first called upon to promote; namely, the education of boys in the West of England with a view to employments in agriculture, arts, manufactures, and commerce, and they are anxious to learn the wishes of those most deeply interested in the subject, whether as teachers or as parents.”

Mr. SILLIFANT, in moving the adoption of the report, congratulated the Committee on the success of a measure at first considered merely experimental. Believing that the Middle Classes were quite capable of taking care of themselves, and that their children needed no assistance in the way of charity, he thought that the University had done all that was needed by giving the independent schoolmasters a *locus standi*, and providing them with a public, unbiassed test of the quality of the instruction they imparted.

Mr. ACLAND, at the invitation of the chairman, next addressed the meeting. He commenced by stating the effect of the report which he had just read. If the report was adopted by the meeting, the temporary conduct of the examination would remain in the hands of the examination committee appointed by a large open committee containing all the subscribers. If they wished, so to speak, for any fresh constitution, or that any further discussion should arise on the rules already acted upon, it was for the public to say so, and the committee would take steps to carry out their wishes ; but if, on the other hand, they considered that the best course would be for matters to be conducted as heretofore, till occasion arose for a more permanent constitution of the body, the adoption of the report would authorise them to proceed as they had hitherto done. He need not say on the part of the committee they would be glad to have the name of any person who could spare time for the purpose added to their councils. But he appeared before them not only as local secretary, but as one of the delegates of the University of Oxford ; he would therefore make a few other remarks, but in doing so would not anticipate the report of the delegates. As some remarks had been made in the newspapers as to the way in which the examination by the delegates was conducted, he thought it right to state that each examiner set his own papers, and was requested, when the answers were returned to him, to assign as many "marks" to them as he considered they deserved. The delegates had settled on a given number of marks to denote the maximum of excellence, and upon that scale a particular number was assigned to every paper of answers by the respective examiners. The meeting might assume ten or twenty, which they pleased—(neither being the real number)—as the maximum standard. The committee received these reports, and multiplied or divided these marks respectively according to the value which they assigned to each subject : on these figures, so calculated and summed up, the decision was taken. It was a work of great labour, and Dr. Temple took a chief part in it ; but a considerable number of persons were engaged for a fortnight in making up the awards founded on the reports of the examiners. In the preliminary examination the delegates had the advantage of two valuable public men—Mr. Walrond, examiner under the Civil Service Commission, and Mr. Sandford, of the Privy Council Office. Arithmetic and spelling were the two turning points in the examination that were made absolute. It was found in point of fact that the strict application of the requirements of the programme of the examination would have committed such severe slaughter among the candidates, that the utmost efforts were made to modify and diminish the requirements as far as

possible, but the regulations with regard to spelling and arithmetic were rigidly insisted upon. And they would allow him to give them the view which the delegates took of that matter. Let them suppose that the University of Oxford, having conferred the title of Associate in Arts on a clever young man, he, while bearing the honours of the University, was told by a merchant to sit down and write a business-letter. Supposing that, notwithstanding the honourable title he had received, his letter was ungrammatical and faulty in spelling—he put it to commercial men—what value would they assign to the Oxford examination? Was it not, therefore, common sense on the part of the University to demand that the requirements to which he had alluded should be sustained? In the department of English literature, the acquirements and attainments of young men in some parts of the country were quite surprising; but he would proceed to remark on the views acted upon with regard to the subject of language. A slight preference was given to Latin, and only a slight preference; but no preference to Greek over French or German. He did not wish to go further into particulars, but it was thought, with regard to Latin, that a preference should be given to it as a discipline. They did not think it their duty, in propounding a scheme of education for the practical classes in England, to give undue encouragement to classical knowledge, though the candidates under examination, if they were good classical scholars, had an opportunity of showing it. That, in his opinion, was a sound and reasonable arrangement. With regard to mathematics, some of the candidates had suffered from not remembering what they had to do. They had to pass in Euclid and Algebra, and one of the requirements was, that the minimum in each of these subjects should be attained before the other answers were considered; that whatever number of subjects they brought up, the pupils must show a minimum in one or two of them; having attained that minimum, all their other knowledge would count, but not otherwise. The object was to discourage a kind of education that sought to accumulate a superficial knowledge of many things in the place of an accurate knowledge of one or two. This was one of the circumstances which gave a practical character to the examination, and no doubt it worked perfectly well; for though in the first year it might have caused discouragement to some promising boys, he hoped that would be put right another year. Passing on to the subject of Art, he believed this was the first time that a thorough alliance had been formed between the arts of drawing and music, and general education; or that either of them had been recognised as a test of a liberal education. As a necessary consequence, the delegates were extremely strict in the application of that test; and under the

advice of able men, such as Mr. Ruskin, Mr. Richmond, Mr. Dyce, Mr. Evans, and Mr. Cockerell, the most stringent requirements in the elementary part of drawing were insisted upon: without that, no accomplishment in style, as it was called, went for anything. He must say that, with a few exceptions, the result had disclosed a vast amount of misapplied time, and he thought the result was owing very much to a defect in the method of teaching the pupils. The notion entertained with regard to drawing appeared to be, that it was useless for a person to learn it unless he possessed a genius for it; that if he possessed the genius he might do what he liked in it, and do it in his own way, but that he would not stand discipline. To others, to whom the art of drawing would be useful as a training, it was not taught. He believed that the true artistic genius was a very rare gift; but that a certain power of drawing, as a means of communication between our fellow creatures, was, like the art of writing, attainable by every one, if commenced early. He would call the attention of the masters of large schools to the necessity of following up what the country expected of them in the way of drawing, especially as it was connected with commercial and manufacturing pursuits. He had addressed them rather with a view of imparting practical information than anything else; but he could not help congratulating the county on the fact, that the noble Lord Lieutenant had placed a farmhouse and 20 acres of land—as the commencement of a public school for farmers—at the disposal of one of the most devoted educators this country possessed—the Rev. J. L. Brereton, of West Buckland. Without entering into the particulars of that scheme, he desired to call the attention of all interested in the welfare of education to the plan the reverend gentleman was about to lay before the public.*

The motion having been carried, the prizes to the successful pupils were distributed as follow:—

SENIORS.

First Division in Order of Merit (books of the value of 2l.).

A. W. Croft, educated by Rev. P. Holmes, Plymouth; E. Lethbridge, educated by ditto, ditto; D. O. L. Mackay, educated by Rev. J. G. Jonas, Devonport; H. J. Rawle, educated by Mr. Templeton, Exeter.

Second Division (books of the value of 30s. each).

T. Wolferton, educated by Rev. P. Holmes, Plymouth; W. Drew, educated by Rev. S. Stead, Probus; W. Creed, educated by Rev. J. N. Lightfoot, Newton; T. Rawle, educated by Mr. Templeton, Exeter.

Third Division (books of the value of 1l. each).

S. Edwards, educated by Mr. Featherstone, Barnstaple; J. Oliver, educated by Mr. Templeton, Exeter.

* For a brief abstract of the plan proposed, vide "Note-Book."

JUNIORS.

First Division (books of the value of 1l. each).

W. Clifford, educated by Mr. Templeton, Exeter; J. Pulliblack, educated by Rev. M. W. Crowther, Kingsbridge; J. A. Creed, educated by Rev. J. N. Lightfoot, Newton; S. Waymouth, educated by Mr. Paige, Torquay; J. Cross, educated by Rev. E. Roberts, Devonport.

Second Division (books of the value of 10s. each).

S. J. Daw, educated by Mr. Templeton, Exeter; C. Hallett, educated by Mr. Reeves, Plymouth; F. E. Gladstone, educated by Mr. Menneer, St. Marychurch; F. Paige, educated by Mr. Paige, Torquay; W. Spalding, educated by Mr. Templeton, Exeter; W. Rew, educated by ditto, ditto; J. Pearce, educated by Messrs. Woolmer and Jefferson, Bath; R. S. Wilkinson, educated by Mr. Paige, Torquay.

Third Division (books of the value of 5s. each).

W. H. Harvey, educated by Mr. Templeton, Exeter; W. C. Baker, educated by Mr. Halloran, Heavitree; E. Born, educated by Mr. Templeton, Exeter; W. H. Coaker, educated by Mr. Young, Kingsbridge; F. M. Manwood, educated by Mr. Templeton, Exeter; A. J. Newman, educated by Dr. Ridgway, Exeter; T. Rew, educated by Mr. Templeton, Exeter; J. C. Staples, educated by Mr. Menneer, St. Marychurch; M. Templeton, educated by Mr. Templeton, Exeter; R. H. Ward, educated by ditto, ditto; A. J. White, educated by ditto, ditto.

The recipients were then addressed as follows, by

Sir J. T. COLERIDGE: My young friends will probably expect a few words from me on this very interesting occasion. I should be sorry if the transactions of the day were other than those which you must all approve, or that any one should have received a prize without setting a just and proper value upon it, not merely because those who have conducted the examinations have thought you entitled to honourable distinctions; but also as because of the result of that examination the local board of this place have thought it right and proper to testify their appreciation of your success, by, in addition, conferring upon you those prizes which I have had the pleasure to distribute. It is quite natural, as it affords personal gratification to yourselves, that you should take delight in having obtained these prizes; but beyond that, I think there are motives which you will readily adopt, and which will contribute to enhance the value of the prizes you have received, and imprint it permanently on your hearts. It is not merely that you yourselves are honoured, or that you will have the pleasure of taking to your homes, and showing to your friends, the presents or rewards you have received; but you will have an opportunity of evincing your attachment to the school in which you have received your education, and to the schoolmaster to whom you owe so much. I do not know how *you* feel; but for myself I must say that attachment to the school at which I was educated, and the University at which I completed my education,

are yet of the strongest feelings of my heart. I love the very places ; I visit them when I can ; and there is no interest of theirs which I have it in my power to promote, but I do so with the greatest earnestness and delight. Forgive me, if I say, that in my own little dressing-room at home, I have the portraits before me of Henry VI., the founder of Eton ; Richard Fox, the founder of Corpus Christi ; and Walter Stapleton, the founder of Exeter College. Besides this, I can say that there is not a day of my life on which I do not bear their memory in pious recollection, or feel how deeply I am indebted to them for all that I am, and the place I hold in society. What I feel in regard to these places and the memory of these great men, I trust those whom I now address will all feel in respect to the schools to which they belong, and the masters who have there educated them. I understand that several of the prizes have been selected by the prizemen themselves. Altogether, I am delighted to think that the books seem to be so remarkably well chosen, and so calculated to benefit those selecting them by a study of their contents. I am glad to see that Shakspeare has been so prominently selected ; that the works of great historians and philosophers have been the objects of your choice ; and I commend you to the constant study of these books. You will allow me also to say that these books are all perfectly germane to what Mr. Acland, in his excellent address just given, has pointed out as the spirit and soul of this institution and examination,—viz., that it is not intended to reward mere advancement in this or that particular branch of education, which may show that a boy has acquired an amount of knowledge in this or that branch ; but the examination has been directed to the ascertaining whether the teaching has been solid and good, and whether it tends to the formation and improvement of the inherent character. You may depend on it that is the true view of education ; and you will very much lose the benefits of it, unless you try to work into your own minds, and make, as it were, parts of yourselves, the great principles of philosophy, poetry, and grammar, which you will find either directly or indirectly unfolded in the books before you. For that reason it is that I agree entirely with the observations of Mr. Acland, as to the absolute necessity of making, in these examinations, an indispensable preliminary of grammar, arithmetic, and spelling. Spelling is obviously necessary, and without a proper knowledge of grammar no right reason is likely to be found in the breast or conversation of any man. Hence it is that Latin has been selected in preference to any modern language, as no one can be properly grounded in Latin without learning the entire principles of grammar. I have pointed out to you some reasons why I apprehend you naturally feel very much delighted

at your success this day; but there still remains one thing to be pointed out to you, which has a bearing on the school and the schoolmaster in whose school you have been. The fact of your having passed this examination; of having acquired the rank of Associate of Arts—some of you the certificate of merit—of course connects you with that great Institution, the University of Oxford, which has for some time taken the lead in the general education of this country. I rejoiced, and still do rejoice, that the proposition made to the University of Oxford was accepted in the way it was; and I think the steps taken in that direction were not only most important to the country, but creditable to the University. Its importance is great, and the particular effect looked forward to is extremely great; so much so, that there are not wanting many persons who seem to tremble at the consequences that may result from it. I did not participate in their apprehensions; I have no fear so long as education is conducted on a right principle, not merely superficial, but directed to the great formation of the character. I do not fear education, however widely or to what great degree it may be carried; but feeling, as I do, proud to belong to the University of Oxford, I hope you will participate in the same high degree of pride; that as you have attained the honour you will endeavour to justify it by your future career in life. There must, I presume, be several among you who were not fortunate enough on the last occasion to gain the prizes or receive the honour the examination was calculated to bestow. Some reason can probably be assigned for that fact; but I should hope they will have no feelings of jealousy against their successful competitors. To the unsuccessful I would say, that it is not because you have failed once you are to fail again; for those who have not reaped a reward on this occasion may hope to gain a higher step on a future opportunity. I trust that all will go away from the place perfectly satisfied and most undoubtedly convinced, whether successful or unsuccessful, that the examination has been conducted with great skill and labour, and most perfect impartiality.

MR. BULLER, M.P., said he confessed that at first when he heard of the scheme of examinations of the Middle Classes he looked upon it with some degree of doubt and distrust; he feared there were difficulties in the way which would be insurmountable; but he was happy to think that by the ability and perseverance of one individual, assisted as he had been by so many gentlemen of the highest intelligence and purest motives, these great and formidable difficulties had been so far overcome that success might be regarded as a matter of certainty, and it was impossible for any among them duly to estimate the benefits which would ultimately result to society at large. He was glad to find that

those learned societies to which the chairman had paid so just a tribute of respect and praise, had taken a lead on this occasion—that they appeared in their proper position—that it would no longer be said that an Oxford or Cambridge education, and the Oxford and Cambridge honours, were confined to one class, and that class the highest class in society; but that the Middle Class would be equal sharers in the distinction conferred by the votes of those learned bodies, and that they would all of them in one way or another feel an interest in the prosperity of these great institutions. It was most desirable that this great movement should take place. An opinion had been expressed that rather too much had been done for the lower classes of society, and too little for the Middle Class. He (Mr. Buller) rejoiced to find that the time had arrived when that objection—if it were an objection—would be fully met; and he apprehended that this movement would have a tendency to raise the Middle Classes of society—and not that class alone, but that all classes of society would derive a most important benefit; for to his mind it was impossible for one class of society to make a great advance in education and information without a corresponding benefit to all others. The higher classes would never allow the Middle Classes of England to step too quickly on them: the only way in which they could keep their position above them was by a generous emulation, by proving that they felt the advantage of education as essential to them as it was to those who might not be born with the same advantages of fortune, and that they were determined by their merits and exertions to deserve that preference which nature had so kindly conceded to them. Mr. Buller concluded by some complimentary references to Sir J. T. Coleridge, whom he held out as an example of the distinction that a man might gain entirely by his own merits.

A vote of thanks having been passed to the Oxford Delegates and Examiners,

MR. ACLAND said he rose for the purpose of reading another list which was necessary to complete the business of the day; but he could not do so without first thanking them most sincerely, on behalf of the Delegates of Oxford, for the vote of thanks. It was on a body of eighteen at Oxford that the whole of the responsibility of carrying out the examination had been thrown, and he should be forgiven if he specially mentioned the name of Mr. Sewell, since, to his courtesy, and the great labour he had gone through in the last six months, the success of the examination was mainly attributable. He would only make one remark of a general character. The principal object he (Mr. Acland) had in view in this movement was, by means of a general educa-

tion founded on a common literature, to do something towards producing a community of thought and feeling between the highest noblemen and gentlemen of England, and the practical commercial classes, however distinct in social arrangements; for it had long been his conviction that much of the misunderstanding that had hitherto existed between them was caused by the wide divergence of the principles of their early education. He earnestly hoped, however, that by the blessing of God much sympathy would grow up in the midst of them as the consequence of healthy emulation. He (Mr. Acland) must now mention, as one of the results of the Exeter examination, that at its close the schoolmasters invited Mr. Parker and himself to spend an evening with them, at which they were most hospitably entertained; at this meeting a practical discussion ensued on various matters of detail, and the schoolmasters deputed Mr. Templeton to write a letter to the Delegates expressing a hope that the standard which had been fixed for the attainment of the title of Associate of Arts would not be lowered with the view of making the examination popular, but that some notice would be taken of the candidates who had succeeded in some departments though not in all. Mr. Acland stated that the Delegates had in consequence supplied the Committee with information which enabled them to give the names of several of the candidates who had acquitted themselves well in certain subjects, though they did not come up to that evenness or symmetry—so prized by the agricultural community—which would have entitled them to the highest honour. Mr. Acland then proceeded to read the following lists:—

SENIOR CANDIDATES, whose names are not in the Oxford Lists.

I. Candidates who passed with honour and in two subjects:—

- 20 aRichards, Probus School, English (1st division), Language (2nd division).
- 16 aEverson, National School, Redruth, Preliminary and English (2nd division).
- 29 aDultue (Rev. P. Holmes, Plymouth), English (2nd division) and Languages.
- 5 aWreford (Mr. Templeton, Exeter), Preliminary and English (2nd division).

II. Candidates passed in two subjects, and in Religious Examination:—

- 9 aGifford (Rev. C. Clarke, Launceston), Preliminary and English.
- 12 aErle (Mr. Paige, Torquay), Preliminary and English.
- 13 aGlasgow (Mr. Paige), English Mathematics.
- 18 aPasmore (Dr. Ridgway, Exeter), English and Languages.

III. Candidates who passed in two subjects :—

- 14 Cumming (Mr. Paige, Torquay), Preliminary and Mathematics.
- 17 Cox (Mr. Cox, Axminster), Preliminary and English.
- 21 Palmer (Mr. Roberts, Devonport), Preliminary and English.

IV. Candidates who passed in one subject :—

- 11 Snell (Mr. Paige), Mathematics.
 - 24 Fuller (Rev. Mr. Halloran, Plymouth), English.
- Those youths with (a) prefixed to their names passed in the Religious Examination.
-

JUNIOR CANDIDATES, whose names are not in the Oxford Lists.

I. Candidate who passed with honour :—

- 12 Moysey (Mr. Templeton), Latin (2nd division). (Declined the Religious Examination).

II. Candidates who passed in one subject and the Religious Examination :—

- 7 aHancock (Mr. Templeton), Latin.
- 11 aDuff (Mr. Templeton), Latin.
- 15 aLake (Mr. Templeton), Preliminary.
- 20 aAddiscott (Mr. Dommett), Preliminary.
- 21 aJerrard (Mr. Dommett), Preliminary.
- 23 aBrewer (Mr. Featherstone, Barnstaple) French.
- 26 aPackham (Mr. Dommett), Preliminary.
- 33 aSalter (Mr. Dommett), Preliminary.
- 49 aChilds (Rev. C. Clarke), Latin.
- 53 aMerson (Mr. Morse, Taunton), Latin.
- 55 aTaylor (Mr. Dommett), Preliminary.

III. Candidates who passed in one subject :—

- 25 Pearse (Rev. C. Clarke), Preliminary.
- 38 Fyfe (Dr. Ridgway), French.
- 44 Hugo (Mr. Templeton), Latin.
- 46 Bray (Mr. Pridham, Shaldon), Preliminary.
- 47 Gormully (Rev. E. Roberts, Devonport), Preliminary.

IV. Candidates who passed in the Religious Examination :—

- 13 aHooper (Mr. Templeton).
- 22 aSampson (Mr. Featherstone).
- 28 aSpettigus (Rev. C. Clarke).
- 41 aNorthway (Mr. Fouracre).
- 42 aClarke (Mr. Fouracre).
- 43 aHill (Mr. Fouracre).
- 51 aStancombe (Dr. Ridgway).

Those youths with (a) prefixed to their names passed the Religious Examination.

NUMBERS and PERCENTAGE of CANDIDATES who entered and passed at EXETER, as compared with the average standard for the whole of ENGLAND.

SENIORS.

<i>England.</i>			<i>Exeter.</i>		
Number entered, 401.			Number entered, 27.		
	Number Passed.	Per Cent.		Number Passed.	Per Cent.
Preliminary	200	50	Preliminary	17	63
English	279	69	English	23	85
Language	188	45	Language	11	41
Mathematics	125	31	Mathematics	11	41
Physical Science ..	46	11	Physical Science ..	1	4
Religious Knowledge	239	59	Religious Knowledge	19	70
A. A.	150	37	A. A.	10	37

JUNIORS.

<i>England.</i>			<i>Exeter.</i>		
Number entered, 749.			Number entered, 53.		
	Number Passed.	Per Cent.		Number Passed.	Per Cent.
Preliminary	379	50	Preliminary	33	62
Latin	269	36	Latin	25	47
French	232	31	French	10	20
Mathematics	134	18	Mathematics	14	26
Mechanics	42	5	Mechanics	6	12
Drawing	52	7	Drawing	3	6
Religious Knowledge	369	49	Religious Knowledge	39	74
Gained Certificate ..	279	37	Gained Certificate ..	24	45

The meeting was afterwards addressed by Mr. Buckingham, Mr. Templeton, and Mr. Were.

SIR J. T. COLERIDGE, after acknowledging the vote of thanks which had been passed to him as chairman, continued as follows:—With respect to my younger friends I will say, if they will forgive me, one word about myself. Mr. Buller said a great deal about me and my Oxford successes; and, while this was going on, I was reminded by my friend, Mr. Acland, that on going my first circuit as Judge, when I arrived at Oxford I was entertained at a dinner there, and when the guests were assembled, the good rector of Exeter—who has gone to his account—communicated to me privately that his object was not so much to gratify me, as to do something which might be useful to the undergraduates. Now, I wish to repeat to you what I said on that occasion: that all the success which, under God, I have had in life; and in my past career, has been owing not to any peculiar ability, but to steady and continued industry. My young friends may depend upon it, that if they wish to succeed in life, they must not suppose they can do anything unless they pursue the object with steady and determined industry. It is the steady

tortoise which outstrips the loitering hare. Let me therefore caution you against that which is a common failing among boys and young men, of depreciating the value of industry. There have been many young men of great ability, who have concealed their industrious efforts, and fain would have it thought that they gained their acquirements without labouring for them. That—let me say—is an unwise feeling; for no man can be successful in life who does not follow an honest course, put his trust in God Almighty, and pursue his object with continued and unwearied industry.

The proceedings were then brought to a termination.

OXFORD UNIVERSITY LOCAL EXAMINATION AT BATH.

SENIOR CANDIDATES.

SECTION A. (English).—First Division.

Evanson, C. P., Fairfield Villa, Bristol; born Jan. 31, 1842; educated at the Grammar School, Bristol.

SECTION A. (English).—Second Division, in alphabetical order.

Candole, H. S. V. de, Newton House, Bristol; born June 25, 1841; educated at Cotham, Bristol.

Hale, G., Ascension House, Bristol; born Jan. 5, 1841; educated at the Grammar School, Bristol.

Harwood, E., Almondsbury, near Bristol; born June 19, 1841; educated at Spring Hill House, Southampton.

Harwood, S., Almondsbury, near Bristol; born Feb. 18, 1843; educated at Grove House School, Tottenham.

Tovey, D. C., Bristol; born Feb. 28, 1842; educated at Grammar School, Bristol.

Walter, J., Bristol; born July 15, 1842; educated at Grammar School, Bristol.

Watts, E. W., Bath; born Oct. 31, 1840; educated at Grammar School, Bath.

SECTION B. (Languages).—First Division, in order of merit.

Hale, G., Bristol; born Jan. 5, 1841; educated at Grammar School, Bristol.

Hulbert, W. A., East Ilsley, Berks; born Sept. 14, 1840; educated at Shaw House, Melksham.

Cole, W. R., Cotham, Bristol; born June 25, 1841; educated at Cotham.

Candole, H. S. V. de, Bristol; born June 25, 1841; educated at Cotham.

Evanson, C. P., Bristol; born Jan. 31, 1842; educated at Grammar School, Bristol.

Watts, E. W., Bath; born Oct. 31, 1840; educated at Grammar School, Bath.

Harwood, E., Bristol; born June 19, 1841; educated at Southampton.

Harwood, S., Bristol; born Feb. 18, 1843; Tottenham.

Russell, C. D., Bath; born March 14, 1842; educated at Grammar School, Bath.

Tovey, D. C., Bristol; born Feb. 28, 1842; educated at Grammar School, Bristol.

SECTION C. (Mathematics.)—First Division.

Hale, G., Bristol; born Jan. 5, 1841; educated at Grammar School, Bristol.

SECTION C. (Mathematics.)—Second Division.

Evanson, C. P., Bristol; born Jan. 31, 1842; educated at Grammar School, Bristol.

SECTION F. (Music.)

Evanson, C. P., Fairfield Villa, Bristol.

JUNIOR CANDIDATES.

First Division, in order of merit.

Evans, H. H., Clifton; born Dec. 3, 1843; educated at Grammar School, Bristol.

Watts, B. H., Bath; born March 2, 1845; educated at Rectory Middle School, Bath.

Evans, H. F., Walcot; born March 6, 1845; educated at King Edward's School, Bath.

Massy, V. T., Cottesmore; born Nov. 4, 1843; educated at the Hermitage, Bath.

Genge, E. H., Trent, Somerset; born Dec. 24, 1843; educated at The Hermitage, Bath.

Bethell, H., Bath; born Aug. 13, 1843; educated at Cotham.

Bayliffe, A. M., Chippenham; born April 24, 1844; educated at Chippenham.

Beavan, A., Redland; born March 14, 1847; educated at Grammar School, Bristol.

Brice, S. W., Frome; born March 18, 1844; educated at Grammar School, Shepton Mallet.

Colthurst, E. B., Bristol; born July 27, 1843; educated at Grammar School, Bristol.

Drury, J. G., Bath; born Sept. 12, 1844; educated at The Hermitage, Bath.

Falkner, W., Bath; born June 23, 1843; educated at Melksham.

Ferrier, H. J., Redland; born Jan. 10, 1844; educated at Grammar School, Bristol.

Gower, G. H., Bath; born March 7, 1844; educated at The Hermitage, Bath.

Hill, V. W., Chippenham; born Feb. 6, 1844; educated at Chippenham.

Leach, F., Corston; born July 28, 1843; educated at The Hermitage, Bath.

Leonard, H. S., Clifton; born Feb. 3, 1844; educated at Melksham.

Shaw, G. B., Bath; born June 5, 1844; educated at King Edward's School, Bath.

Third Division.

Bush, C. A., Doynton; born Dec. 19, 1843; educated at Grosvenor Place, Bath.

Clifford, E., Kingsdown; born March 27, 1844; educated at Cotham.

Evanson, E. R., Bristol; born Nov. 26, 1843; educated at Grammar School, Bristol.

Goodwyn, J. E., Clifton; born March 4, 1844; educated at Cotham.

Harbour, J. L., Bristol; born Feb. 20, 1844; educated at Grammar School, Bristol.
Hill, A. F., Wookey; born Aug. 21, 1843; educated at Grammar School, Shepton Mallet.
Sims, W., Bath; born May 10, 1844; educated at King Edward's School, Bath.
Stiles, E. M., Chippenham; born July 3, 1843; educated at Chippenham.
Vine, E. H., Blandford; born Nov., 1843; educated at Commercial School, Sherborne.

THE CAMBRIDGE EXAMINATION AT BRISTOL.

ON the occasion of distributing the Certificates to the successful candidates at the first Local Examination at Bristol in connexion with the University of Cambridge, Mr. Acland, having been requested to move the first resolution, spoke as follows:—

MY LORD DUCIE, LADIES, AND GENTLEMEN,—

I hardly know how to find words to commence an address to such a vast meeting, but I can have no doubt that it is my duty to be here this day.

The present is a great public occasion, it is not merely a local Bristol meeting; and after the letters that have been partly read, and the names that have been referred to by your intelligent and laborious Secretary (Mr. Miller), how can you doubt that if you have to look out of the room for sympathy you will find it?

Although I am not in any way connected with Bristol, I have long had the pleasure of enjoying the personal friendship of gentlemen deeply interested in its commercial prosperity and in the social and intellectual advancement of the city and its neighbourhood. As an Oxford man, I could not refuse to come and meet the Cambridge examiner, who is so well known to those present, and connected by local ties with this city.

The noble Chairman has referred to me as the originator of the Examinations of Middle Class Schools, but if I may be allowed to mention a person to whom a debt is due, I should name Mr. Miles, who permitted me, in the year 1854, to address a letter to him which laid the foundation of the expansion of the Bath and West of England Agricultural Society, to my connexion with which I owe whatever influence I have been enabled to exercise on the progress of the question which is the cause of our assembling here to-day.

I beg pardon for having been carried away for a moment from the duty assigned to me by your Committee—namely, to propose the following resolution:—

“That this meeting desires to express its deep sense of the national importance of the local University examinations, as tending to raise the standard of education generally, and particularly to direct the course of study both of public and private schools throughout the country.”

The local University examinations are important to the nation in two senses—First, in a material sense, as ours is a dense population living on one small island—for it is small, relatively to the masses of *terra firma* in the globe—in a highly artificial state of industrial and manufacturing energy, these examinations tend to strengthen the mental power of those engaged in manufacturing and commercial pursuits; but they are also important to the nation in another sense as tending to awaken a higher tone of thought and feeling, and thereby to counteract many of those disadvantages which in some degree attach themselves to every commercial and money-making nation. They tend also to bind all classes together, and to call out in individuals, however separated by these occupations, the faculties of the human being, and help to make them true Englishmen.

I must crave your indulgence if I attempt shortly to give some grounds for what I have stated; but I quite tremble in addressing you (notwithstanding the kind encouragement you give me), because of the extent of my subject, lest I should detain you too long. I will be as short as I can in laying before this great meeting, including many mothers and sisters of candidates, the cause of this mighty gathering. In order to give you an adequate comprehension of the matter, I must first speak of others who have been before you in the work in which you are now engaged. I am not going to speak of all that has been done for the improvement of national and British education by benevolent men, who applied themselves to the task of providing an education for the poor in the beginning of the century, nor of the foundation of mechanics' institutes; but it must be evident to those who look back for the last twenty years—say since the period of the passing of the Reform Bill—that many attempts have been made to cultivate the minds of the young of the middle rank of society. This has proceeded from various causes, and men have been engaged in it from opposite motives. Some have been animated by the desire of stamping their religious mark on the education of the middle rank; but though I have sympathised in some degree with the effort, I must say it has most signally failed in the endeavour to coax the middle classes into Churchmanship by the bribe of useful knowledge. A great change, however, has taken place. Churchmen of all ranks and shades of opinion are now ready to take their part in institutions of a comprehensive character founded for general improvement; and

Churchmen have found that when they maintain their own principles without compromise, but with due regard to the opinions and feelings of others, they will lose nothing by co-operating with their fellow-countrymen for objects which they have in common.

Another class of effort has been made to induce lads to learn Latin and Greek, or mathematics, or other branches of learning taught at the Universities or public schools, by holding out to them the prospect of being helped on in their business—being made engineers to order, as it were, or farmers; but this has failed, as has also the splendid effort made by Sir C. Lemon to establish a mining school at the extreme end of the peninsula near Land's End. With regard to the Agricultural College at Cirencester, though I believe that, on its present footing as a college for adults, it is in a flourishing state, if Mr. Sotheron Estcourt had been present, he would have told of the troubles it has had to go through; and if I were to go farther into particulars, the case of the College would only tend to prove the national importance of general education as a basis for practical skill.

Look again at the College for Engineers at Putney, founded under the presidency of the Duke of Buccleugh, and conducted by Mr. Cowie, now Her Majesty's Inspector of Training Schools—an office once filled by the Rev. Canon Mosely. What, I ask, is the reason why these great efforts, which have cost many men large sums of money and a vast amount of time, have not succeeded? Perhaps I shall best explain by relating a conversation which took place between myself and one of the first engineers in England. I said to him, "I wish you would tell me the best way to educate a young engineer;" his answer was, "Send him to King's College." I asked, "Do you mean to the Vulcan shops in the substructions of the College?" "No," replied the engineer, "I mean send him to the Grammar School of King's College and give him a good grammatical education, or give him a good mathematical education; then send him to a real workshop, where business is done *as* business, not as a model for teaching by." In other words, "send him to school and make a man of him; then send him to the shop and make a workman of him, and leave him to make himself an engineer." This conversation is only a sample of a deep-seated feeling pervading the middle ranks of society, and serves to explain the failure of the various well-meant efforts to which I have referred. Rightly or wrongly, parents think such institutions form bad habits and do not answer, and therefore they will not support them. I know I am speaking in the presence of men of the highest intellect—in the presence of men who have given close attention to the subject,

and I shall only say that my security lies in that consciousness; therefore if I presume to utter boldly and frankly my convictions, I trust those present will be equally frank in the expression of theirs. At any rate I shall have attained one object if I am able to convey to this great meeting the depth of my strong personal conviction that it is of paramount national importance to give a right direction to general education as a preparation for the business of life, rather than to waste our energies on schemes for technical and professional teaching, which in the present temper of Englishmen are unlikely to succeed. The fact is that the English are a practical people, and as that has become almost a cant phrase, I must say more definitely they are a self-relying and a self-governing people, and therefore parents in every class above the pauper dislike the direct control of the class above them; and they are firmly persuaded, and I think they are quite right, that they can train their children in habits of business better than most of those who undertake to teach them. Let me not be misunderstood. I do not mean to depreciate true scientific knowledge; but I think that farmers can teach farming better than the majority of those who profess to enlighten them, and engineers, tradesmen, and merchants understand their own work better than the most learned professors; and what is more to the purpose, when we seek to obtain the co-operation of parents, they believe that they know best what they want, and are willing to pay for. On the other hand—I say it with all respect for the middle classes, the landed gentry, great merchants, and tradesmen—that take them altogether, and I include myself as a father, they are not the best judges of the details of education. I can answer for myself that I have often been at issue with those who have been kind enough to undertake the charge of my sons' education, and I have generally found, when I came to discuss the matter with those practically engaged in it, that I have had to modify my own too hasty conclusions or impatient expectations. The fact is, in England practical improvement in the business of life has gone far ahead of the corresponding scientific knowledge. Now, however, the value of sound principles is becoming better appreciated by practical men, because, amongst other reasons, the professors take more trouble to listen to the requirements of practice, and in its turn the wider diffusion of scientific principles is leading the public to a more earnest demand for the general cultivation of the mind itself.

I am now to show how this demand has sprung up and embodied itself in the University Local Examinations. I have said that there is a close connexion between the work we are now engaged in and a certain Society in the West of England. That great and good man Philip Pusey, who was much appreciated by the most enlightened of his fellow countrymen, but

not altogether as he deserved by those for whom he worked, taught me, some fifteen or twenty years ago, the substance of what I have been endeavouring to express to you. He taught the vast importance of developing agricultural resources before the repeal of the Corn Laws; for he had foresight enough to see that the English farmer would have himself to depend on. He has let his mantle fall on many—amongst others, on a number of gentlemen, landowners and farmers, in the West of England—who have acted together harmoniously for seven years in a large Agricultural Society, which has succeeded in attracting a large number of manufacturers to its meetings, and has diffused a great deal of information throughout the district.

In connexion with this Society, a noble-minded Englishman and a nobleman by birth (Lord Ebrington), who has, as you know, lost much of his health in the prosecution of his benevolence for the sake of others, proposed to give a prize for the best-educated farmer's son. The farmers did not altogether receive his Lordship's offer in the most gracious manner, but perhaps he had not consorted so much with the gentlemen in top-boots as I have. Though not altogether agreeing with his Lordship in the plan, I was very glad to co-operate with him. The Society was induced to give some countenance to the scheme, and through its Journal was the means of calling public attention to the subject, and making the importance of it known to many hundreds of persons throughout the West of England. It occurred to some of us that it was beginning at the wrong end to give prizes to adult farmers, but that inducements should be given to schoolmasters to improve their schools. An attempt of this kind was made at Exeter in the year 1857. A scheme of examination was set on foot, with the assistance of Dr. Temple, a Devonshire man, being at that time an Inspector of Training Schools. We found in the Privy Council Office a Christchurch friend and a Balliol friend, and they were persuaded to strain a point in order to give the proposal a fair trial. Dr. Temple, an Oxford man, and Mr. Bowstead, a distinguished Cambridge man, came down to assist. Mr. Cowie, a Cambridge Senior Wrangler, also took part in the examination. The schoolmasters responded to the scheme. A great deal of pains had been taken to confer with them and to ascertain their wishes, and, as no doubt Mr. Miller and the Bristol Committee are well aware, much of the success of such experiments depends on the pains bestowed on details by those who undertake the management. The result was that a large number of candidates appeared, and the examination was quite satisfactory. On the very day of the examination at Exeter the telegraph brought the news from Oxford that Convocation had passed the statute establishing the

examination of those who were not members of the University. This is not a suitable occasion for discussing the merits of the Oxford and Cambridge schemes, but as I have come here for the purpose of showing my respect towards Cambridge, I cannot refrain from saying that, twenty years ago, I derived mainly my first impressions on the subject from that great and good man H. J. Rose, and that large-hearted man C. J. Blomfield, Bishop of London. I will also mention another man, who was first at Cambridge and then came to Oxford, and took his degree there, and whose name is welcome to the ears of working men all over England—I refer to Frederic Denison Maurice.

I am glad to take this opportunity of publicly stating, in the presence of distinguished Cambridge men, that both Universities were consulted at the same time, or within a very few days. In the same week in which Dr. Temple was communicating with his friends at Oxford, I wrote to the present Dean of Ely (Dr. Harvey Goodwin), and I have now in my pocket a long letter from him, dated the 13th of April. In consequence of many valuable suggestions from Dr. Goodwin I made several alterations in what I was then publishing. Before any appeal to the public was made some of the best Cambridge men had been consulted, though it has been said (but I hope I have now shown that it was said without correct information as to the facts) that no steps had been taken to consult Cambridge in the matter. The fact is that Oxford had completed the new arrangements required by their Act of Parliament, which was three or four years old, when the Act relating to Cambridge had been but recently passed, and that University was entirely occupied. A more inconvenient time could not have occurred for consulting them on any new subject, and that was the reason why Cambridge and Oxford did not move simultaneously. However, it seemed to us at Oxford that the matter was ripe for decision; and the leading men were convinced that the time was come for action. Before the regulations were published to the world several of the Oxford delegates, filling high offices in the University, went to Cambridge, and as I had the pleasure of meeting them there, I can testify that I never witnessed a more agreeable or more business-like conference than that which was held under the presidency of the Vice-Chancellor (Dr. Phillpott) in the Fitzwilliam Museum. After conferring with the authorities in Cambridge almost all the suggestions made by them were adopted. There were obvious advantages in the course actually pursued. The first experiment was tried by one University single-handed, and therefore more freely; and the benefit of its experience was brought out for the advantage of the other University. I think in many respects the second Examination was a con-

siderable improvement on the first. There are some points on which probably both Universities will continue to take different views ; but I cannot too strongly express my sense of the importance of the co-operation of the two Universities, and my conviction that, whatever minor differences there may be in the arrangement, the same high and honourable spirit will animate both and deserve the confidence of the nation.

I feel ashamed of detaining you so long, but if you will bear with me a little longer, I will now show in what way it is that the Universities' Examinations tend to solve the question of the relation of General Education to the business of life. This will lay the ground for the second part of this resolution—that the “examinations tend to raise the standard of education in public and private schools.” The Universities recognise the independence of the schoolmaster and the independence of the parent, while their own independence as examining bodies stands above all question and suspicion. No attempt is made to inspect schools or to interfere with domiciliary arrangements, about which parents are so sensitive, or to lay down the course which education ought to take in the schools. The Universities have shown their willingness to consult the opinion and benefit by the experience of schoolmasters throughout England. Letters have appeared in the newspapers urging that the schoolmasters should be consulted as a body, and allowed some influence in prescribing the course of the examination. That is quite another question; it is one thing to listen respectfully to the suggestions of individuals, and another to receive the dicta of organised bodies. The best schoolmasters in England are quite aware that the Universities are ready to take the one course, and that it would be contrary to all sound policy for them to take the other. The Universities also in a marked manner recognise the independence and responsibility of the parent. Those who know what education is, know that the fountain of all instruction is in the mother, and those who understand the position of religious questions in this country are aware that the sacredness of the domestic hearth on religious matters is absolutely essential. We are drawing near the close of twenty years of searching controversy on these questions, and without wishing to go over the ground, which is not suitable to this occasion, I think I shall not be far from the mark if I say that the great majority of parents in England have made up their minds:—1st. That we cannot well draw a very sharp line between the secular and religious elements in education; 2nd. That no one compromise or generalised system of religious teaching can be enforced on all denominations; and 3rd, as a necessary consequence, That in any public scheme we must be prepared to act on a very compre-

hensive principle, and to respect the religious opinions of others with whom we differ, giving scope to them in their entirety, though we may not be responsible for what we do not approve.

Both Universities felt this, and the one which had to take the first step was obliged to feel its way cautiously, but as it turned out successfully. At Oxford we thought it our duty to make our arrangements with the most scrupulous regard to perfect fairness between Churchmen and Dissenters; and not to allow the examination in religion to count at all towards the Candidate's place in the Division Lists; at the same time we felt bound to submit all who did consent to be examined in religion to one uniform examination in the rudiments of Faith and Religion. One eminent Dissenter brought his scholars from Newcastle, and another from Swansea, and would not stop at Birmingham or Bristol, but came on to Oxford, and expressed a determination to do so again next year—perhaps, however, they will go to Cambridge instead.

The plan pursued at the Oxford examination gave confidence to the whole country, and that confidence, I believe, has been increased since the questions have been published. We regretted that a large proportion of the Candidates declined the religious examination, but I think it probable that on a future occasion these objectors will be fewer than they were at first. The Cambridge arrangements were different from those of Oxford; it is not necessary for me to enter into details; at the same time I am bound to confess that the Cambridge scheme has succeeded in inducing the Candidates with very few exceptions to pass the examination in the Bible at least. Each University in fact attained the object at which it appears to have aimed: Oxford to place its impartiality beyond a suspicion—Cambridge to give some encouragement to the Candidates to pass the examination in religion. The experience of the next year or two will probably show the best way of dealing with this subject. The impression which I would earnestly desire to leave on my audience is, that on the parents, and on the parents alone, rests the whole responsibility of withdrawing their Candidates from the required test of their religious knowledge. These then are the main principles on which the University Examinations of schools are instituted; I earnestly trust that they may have the effect predicted in the resolution which I hold in my hand, viz.: that of raising the standard of school education both public and private. I think we may look forward to the following results. In the first place the schoolmaster, and above all his boys, will have a definite object set before them to work for, and a perfect confidence in the test to which they are submitted. Accuracy in elementary subjects, and the mastery over a few rather than a

superficial acquaintance with several, are the turning points in public school education, and mainly insisted upon in the regulations of the two University Examinations. The second great result to be expected is a more general community of thought and feeling between the various classes of the nation, so that when the literary man, or clergyman, or minister of religion speaks, he may be able to use the language his own heart and mind prefers, with the conviction that it will be understood by those to whom he speaks. Perhaps I ought to add that some of the learned professions will also find that the purest and simplest vernacular will give them most influence with their hearers. I believe that much of the misunderstanding in this country arises from a want of a general literature pervading all ranks of society, but I earnestly and heartily hope one of the results of the examinations will be that English language pure and undefiled will be more thoroughly appreciated by all ranks. Now is perhaps the first time that the works of Shakespeare and Bacon have taken their places among the instruments of education of the young, and been made the subjects of public school examinations.

There is one other characteristic feature of these examinations to which I beg your permission to refer, because I have laboured most earnestly for its introduction. I allude to the place which the Arts hold in the programme of examination, side by side with Literature and Science. Where can this subject be more fitly referred to than in Bristol? On the left hand of this building is another structure, the purpose of which is an honour and credit to this city. The Fine Arts Academy is an institution of which Bristol may well be proud. Bristol, also, and its neighbourhood, are celebrated for the munificent patronage of the arts, and may boast of artists who are worthy of their patrons.

And here I rejoice to have the opportunity of declaring how deeply I am convinced that the introduction of art into general education, and especially into that of the mercantile and manufacturing classes, is closely connected with the prosperity of England and its people. For this reason. We are in a highly civilized and artificial condition, with a population closely packed, and eagerly competing for the means of a livelihood; one of the consequences is, that alongside of great accumulations of wealth and luxury, we find a number of persons of both sexes, with their nervous temperament highly developed, incapable of hard labour, or of high intellectual effort, some of whom are yet endowed with quick susceptibilities and practical skill, the observant eye and delicate hand; such persons are quite capable of making designs for the most beautiful fabrics which our manufacturers can produce. The number of these persons is being yearly multiplied by the encouragement given in schools of design and

other institutions for the purpose of fostering the art-talent of the country. Much also has been done by the department of Science and Art at South Kensington, under the patronage of the Prince Consort, to raise the standard of design in English manufactures; but permit me to ask you, ladies as well as gentlemen, where is the market and where are the customers who appreciate the refined skill of the artist, in comparison with showy ornament, as indicative sometimes of possession, but more often of the pretence and appearance of wealth?

But if those who are thus endowed and thus trained cannot live by their art, oh! how bitter must be their privations, how severe the trials to which they must be subjected!—and all this because a vulgar and a lavish expenditure on tawdry ornament, or, what is worse, the most pitiful pretence and imitation, is preferred to the beautiful work of the mind and hand of man. Is it not a monstrous thing that men should enter upon their duties as Members of Parliament and town councillors, and be called upon to decide on public works involving the expenditure of thousands—nay, millions of pounds, and capable of affording work for the most accomplished artists and skilled workmen, and yet that persons exercising such responsibilities should be ignorant of the history and first principles of art?—for, gentlemen, art has its principles as well as science—not, indeed, dogmas by which the critic assumes to cramp the genius of the artist, but principles which follow after, and are deduced from the works of great men. For, in art as in literature, it is no less true that genius and common sense alike arise superior to theory. In the study of great works we discover principles which may guide us in appreciating what has been done by these works, and therefore it is that no man who is entirely ignorant of the history and principles of art can be called a thoroughly educated man. But there is another reason why it is especially important for the Middle Classes not to neglect this subject, because the first principle of all good design is that it be in accordance with the properties and capability of the material employed. If such knowledge were generally diffused amongst purchasers, manufacturers would not go on producing imitations of beautiful designs in fabrics utterly unsuited to them; nor would feeble and tasteless imitations of costly articles be tolerated. In fact, in the present day the trash which used to pass current as good art cannot much longer hold its ground against the increasing study of natural objects. I remember well Dr. Buckland, in his lectures, contrasting artistic and geological drawings: in the present day no competent person will accept as truly artistic what is inconsistent with the real facts of nature. Now, I am not prepared to say that the remedy for all the evils to which I have

referred is to be found in the examination of a few boys annually by Oxford and Cambridge; but this I do say, that great national benefit is to be expected from associating the scholars and artists in such a work as that in which we are engaged.

And, as regards the Candidates themselves at these examinations, in proportion as they learn to do their work honestly—to seek distinction by the path of truth and labour, and whether in their judgment of a book or a work of art, or in their estimation of a piece of china or metal work, to despise all falsehood in matter, fact, or feeling—all feeble imitations and shams—they will begin to understand something of the mind of a great artist or a great scholar.

In addressing a word in conclusion to the Candidates, I have only to express a hope that their friends will not allow them to overtax themselves by intellectual effort, or to neglect their bodily health. One examination in a year must surely be enough, and I earnestly hope that before long the two University Examinations will be either in alternate years, or simultaneous at one season of the year—for my own part, speaking from some experience as a local Secretary, I see no reason why the examiners from both Universities might not meet in the same town with great advantage. To yourselves, my young friends, I will only say that it gives me great pleasure to see you here; to you it must be a source of great pleasure to see so many eminent men take an interest in your success: you will, I trust, feel the more respect for the institutions of your country; and if some of you go forth from this great port of English commerce to distant lands, you will remember the blessings you owe to free institutions and free discussion, and carrying them with you to your new home, you will strive to hand them down unimpaired to those who come after you.

Several gentlemen, including the Rev. Canon Mosely and M. D. Hill, Esq., Q.C., Commissioner of Bankrupts, having addressed the meeting,

On the motion of a vote of thanks to Dr. Temple and Mr. Acland,

Mr. Acland said: I wish to take a liberty with the meeting and to add the name of the Rev. Mr. Bellairs, inasmuch as we are all especially indebted to him for originating that expression of public opinion which induced the Universities to take the important step of establishing these examinations. The Learned Commissioner, who so ably addressed the meeting, is well aware that the memorials on this subject first proceeded from Birmingham, and he is also fully cognisant of the efforts made both by Mr. Bellairs and by the public journals of that town on the subject. I wish also,

with reference to the observations made by the Rev. Canon Mosely, to say that I have frequently acknowledged the importance of the examinations of the Society of Arts on which Lord Ebrington's plan was avowedly founded ; but I may be forgiven for observing that the Universities are educating institutions, and that it should therefore be their object to give direct encouragement to regular education, rather than to deal with the efforts of those whom the Learned Commissioner well called "the band of civil heroes," or the self-educated, who endeavour to repair the neglect of a regular training in early life. I do not think that University habits particularly qualify the resident members of colleges to appreciate the somewhat desultory efforts of those engaged in the work of life ; but in any way in which their services can be useful for this purpose, University men never have been, and I am sure they never will be, wanting.

*List of Students under Sixteen Years of Age who obtained Honours
(arranged in Alphabetical Order).*

CLASS I.

- r. e. l.* } Clifford, W. K., Exeter ; educated by J. Templeton, M.A., Exeter.
m. mh. }
f. m. Clift, E., Trowbridge ; educated by C. T. Hudson, M.A., Grammar School, Bristol.
m. Genge, E. H., Trent, Sherborne ; educated by W. Horner, Hermitage, Bath.
r. l. }
gr. b. } Lingen, C. J., Hereford ; educated at Cathedral School, Hereford.
l. gr. m. Lowthian, G. D., Hornsea ; educated by H. Jefferson, New Kingswood School, Bath.

CLASS II.

- Baker, S. V., Bristol ; educated by C. T. Hudson, M.A., Grammar School, Bristol.
e. Beavan, A., Bristol ; educated by C. T. Hudson, M.A., Grammar School, Bristol.
e. l. Daw, S. J., Torquay ; educated by J. Templeton, M.A., Exeter.
 Ferrier, H. J., Bristol ; educated by C. T. Hudson, M.A., Grammar School, Bristol.
r. Gower, G. H., Bath ; educated by W. Horner, Hermitage, Bath.
l. f. Napier, F. P., Manchester ; educated by W. F. Shaw, Bath.
 Rew, W., Exwick, Exeter ; educated by J. Templeton, M.A., Exeter.

CLASS III.

- Barnes, J. K., West Indies ; educated by Smith and Goldie, Shaw House, Melksham.
m. Coaker, W. H., Charlton, Kingsbridge ; educated by J. Templeton M.A., Exeter.

- Colthurst, E. B., Bristol; educated by C. T. Hudson, M.A., Grammar School, Bristol.
- l. Daniell, J. L., Bristol; educated by W. F. Shaw, Bath.
- Hill, V. W., Chippenham; educated by John Wilson, M. A., Chippenham.
- Playne, E., Minchinhampton; educated by J. Exley, M.A., Cotham.
- l. Richmond, H. S., Wyck Risington, Stow-on-the-Wold.
- Slatyer, J. T., Devizes; educated by R. W. Biggs, L.L.D.

Twenty-six students satisfied the Examiners, but are not included in the above lists.

List of Students under Eighteen Years of Age who obtained Honours.

CLASS I.

- r.l.gr.f. Evanson, C. P., Bristol; educated by C. T. Hudson, M.A., Grammar School, Bristol.
- l.f.m. Hale, G., Bristol; educated by C. T. Hudson, M.A., Grammar School, Bristol.
- r.l.f. Tovey, D. C., Clifton; educated by C. T. Hudson, M.A., Grammar School, Bristol.
- r.l.gr. Washbourn, J. A. R., Gloucester; educated by Rev. H. Fowler, M.A., Gloucester.

CLASS II.

- f. Candole, H. S. V. de, Clifton; educated by John Exley, M.A., Cotham.

CLASS III.

- Payne, J., Durdham Down; educated by Dr. E. J. Pearce, Great Ealing School, London.

List of Students who satisfied the Examiners, but are not included in the foregoing Classes.

- Bryant, A. C., Plymouth; educated by T. A. Smith, Weston-super-Mare.
- r. Budge, W., Camborne; educated by Rev. H. Fowler, M.A., Gloucester.
- Dunscombe, M. W., Westminster.
- Manwaring, J. N., Leominster; educated by J. Exley, M.A., Cotham.
- Vining, F. W., Kingsdown, Bristol; educated by R. T. C. Rowlatt, Colston's Hospital, Bristol.

b.	Distinguished in Botany.
c.	" Chemistry.
d.	" English.
f.	" French.
ge.	" German.
gr.	" Greek.

l.	Distinguished in Latin.
m.	" Mathematics.
ma.	" Mechanics and Hydrostatics.
r.	" Religious Knowledge.

LETTER ADDRESSED TO SCHOOLMASTERS IN THE
WEST OF ENGLAND BY THE SECRETARY.

Exeter Local Committee,
Broad-Gate, Exeter, March 29th, 1859.

SIR,—I am requested by the Local Committee at Exeter to acquaint you that the forms for registering the names of Candidates for the Examination to be holden at Exeter on June 14th, 1859, and following days, are now ready. The forms may be obtained on application to Mr. Roberts, Broad-Gate, Exeter, and are returnable *before* the 1st May. No names will be received at any place after the 30th April. The time for the admission of Candidates has been extended to as late a day as possible, and registry at any of the local centres will now be equivalent to registry at Oxford up to the last day—viz., April 30th.

The Committee are willing to receive the names of Candidates at Exeter for the year 1859 free of all charge for local expenses. But I am desired to state that in future years the expenses incurred at Exeter must be borne, as in other places, by those who are chiefly concerned in securing to the Candidates the convenience of a local centre of assembly—viz., by the friends of the Candidates themselves.

The fee payable by Junior Candidates to the University is raised from 10s. to 15s. It is now half the fee (30s.) payable by Senior Candidates; that amount remaining unchanged. The expenses attendant on the organization of local examinations were such that the remuneration offered to the Examiners was inadequate to the service rendered by them. The work done by the Delegates in making up the results of the Examination, extending over a long period, was entirely gratuitous.

With a desire to save inconvenience to the friends of the Candidates, the Delegates have dispensed with the production of the certificate of birth, except in cases where circumstances may appear to require it. The declaration of the parents and the publication of the dates of birth will, it is hoped, be a sufficient security against accidental or intentional misrepresentation of the age of the Candidate.

Some trouble will also be saved by the form of Objection to the Examination in Religious Knowledge being included in the same paper with the statement of the subjects in which the Candidate offers to be examined. The Delegates have endeavoured, by an alteration in the mode of publishing the results of the Examination, to show the importance attached by the University to religious instruction. Nevertheless, those whose parents conscientiously object to this part of the examination stand on pre-

cisely the same footing with reference to the General Examination as those who are conscientiously prepared for the Examination in religion. The case of Candidates who, without any ground in conscience, are withdrawn from this part of the Examination, deserves no consideration save with a view to discourage such a practice. Such withdrawal cannot take place without the cognizance and personal consent and deed of the parents or guardians. On them, therefore, and on them alone, rests the responsibility, if this most important part of their children's education is not enquired into.

It is believed that no case of such evasion occurred at Exeter, while the answers of many of the Candidates showed how well they had been instructed in the Holy Scriptures and the formularies of the religion they profess.

It is satisfactory to know that the Candidates at the Oxford Examination in June last, and at the Cambridge Examination in December, were not limited to any particular class. Candidates appeared from a great variety of schools,—from grammar schools of high repute, from private, classical, mathematical, and commercial schools; and both at Exeter and Bristol the West of England Candidates maintained a very high position in competition with the whole of England.

The Committee at Exeter have never lost sight of one important object aimed at in their original appointment—viz., to offer encouragement and support to the conscientious teachers of boys who leave school at an early age, and whose school fees are fixed at a comparatively moderate scale. Many boys from such schools acquitted themselves with great credit at the first Exeter Examination in 1857, and there is no reason for them to fear that they cannot reach the standard of the more General Examination of the University. In the case of Oxford especially, the exclusion of all Candidates above the age of 15 from competition in the Junior Examination is intended to provide for schools of the class referred to, as appears from the 49th paragraph of the Report of the Delegates, from which an extract is appended to this letter.

In the same Report are pointed out causes which sufficiently account for the imperfect success of many Candidates who had, beyond all doubt, been the subjects for a longer or shorter time of good teaching.

Some of those causes were inseparable from the first Examination, and are not likely to recur; some are specially guarded against in the regulations for 1859. Other causes of failure can only find a gradual remedy as parents and teachers come to recognise the truth that all sure progress of boys must be slow and must rest on a good foundation.

The children of respectable parents much occupied in business often take the first steps in reading, spelling, arithmetic, and grammar, whether at home or in private establishments, under teachers far inferior, at least in method, to the well-trained masters and mistresses who instruct the children of the poor in the same subjects under the frequent supervision of persons of good education and of responsible public officers. It cannot be too often repeated that under such defective teaching dull and inaccurate habits of mind are contracted which the discipline of the best school cannot correct in one, two, or even three years; and which prove to be a disadvantage only surmounted, if at all, by toilsome personal efforts in after-life; and yet schoolmasters are expected during a few months not only to repair the evils of early neglect, but to finish their pupils, as it is called, by adding a copious supply of the Arts and Sciences, supposed to conduce to success in business; an expectation which can only be compared to that of a farmer who should enter on a farm foul and out of condition with the anticipation of making a good profit at the end of twelve months.

To render the education of the rising generation of yeomen and tradesmen worthy of their position in society it is necessary that more care be given to early training; that the attention of boys at schools be closely confined to fewer subjects, that a mastery be gained over elements and first principles, and that sufficient time be allowed to prepare for an Examination which shall give the pupil an object to work for with the hope of bringing credit on the place of his education.

To fortify these arguments I have appended a few extracts from the Report of the Oxford Delegates, which has had a limited circulation. There can be little doubt that the statements there made, supported as they are by experience, will weigh with intelligent parents to whom they may be submitted; and that those masters who have energy and ability to fulfil the required conditions will find, as some have found already, that the path of duty not only leads to success at the end, but is lightened by the increased cheerfulness and vigour imparted to the daily labours of those under their charge.

I have the honour to be, Sir,

Your obedient and faithful Servant,

THOMAS DYKE ACLAND, Jun.

P.S.—Perhaps I ought to add, that although I act under the general direction of the Committee in addressing you, I am alone responsible for the freedom of expression which I have ventured to adopt. But I make no apology, remembering with

great pleasure the kind reception of Mr. Parker, the Oxford Examiner, and myself by the schoolmasters assembled at Exeter during the Examination week in 1858, and the important information which resulted from that Meeting. I will only add, that if you have any fresh suggestions to offer on the practical working of the Oxford Statute, or on the means of co-operating with the Sister University with a view to limit the occurrence of Examinations to the periods and intervals which may be most convenient, I shall be happy to represent your opinion to the Delegates at Oxford.

Extracts from the First Annual Report of the Delegacy to Convocation.

(Paragraph 5.)—"It was unanimously agreed that a certain amount of elementary knowledge in the ordinary subjects of education ought to be made an indispensable condition of success. The schoolmasters were as anxious as the Delegacy to insist on this point. For though in some cases schoolmasters may be tempted to push their pupils on too fast, and to make a show of special knowledge without any solid foundation underneath it, yet the fault is not always, perhaps not often, theirs. They are urged by parents and by scholars, and, while unsupported, are unable to resist the pressure. The natural desire to see plain tokens of their children's progress leads the parents into this mistake, and the restlessness of childhood always makes boys more eager to advance quickly than to learn thoroughly. A knowledge therefore of the Elements of English Grammar and Orthography, of Arithmetic, of Geography, and of the Outlines of English History, was required of all: and it was intended that absolute failure in any one of these subjects should disqualify a Candidate."

(Paragraph 33.)—"The great number of failures on this occasion must not be taken as a perfectly accurate index, either of the attainments of the Candidates or of the working of the schools." "On the late occasion there can be little doubt that a large number of Candidates did not do themselves justice. Some, probably, were excited and lost their accuracy of memory, and their power of expression. Perhaps they did not quite understand what they wanted to do; others did not remember which were the important points; above all, they were unconscious of the lapse of time and frittered away hours before they were aware what they were doing. Moreover the attempt to confine the examination within the limits of a week had driven the Delegacy, as has been remarked before, to cut down the time allowed for each paper to the very minimum. For these reasons, perhaps inevitable, it is probable that many failed on this occasion, who, with a little more experience of such examinations, would certainly have passed. Every allowance was of course made that could be made, but if Candidates had been passed, not because their papers deserved it, and not because there was reason for thinking that the papers did not represent their real merits, the decisions would have been null and the Certificates valueless."

(Paragraph 34.)—"The great bulk of the failures was caused by inability to pass the preliminary examination; and it would be quite a mistake to conclude that none were fit to pass this examination but those who actually did so. On the other hand, it must not be denied that this is the weak side of school work; indeed many very intelligent schoolmasters had previously spoken as if the chief benefit of the whole plan consisted in the aid it would

give in their effort to ground boys well in elementary knowledge before pushing them forward into higher subjects."

(Paragraph 46).—"If the Examination be taken as a whole, and the peculiar circumstances attending a first experiment be fairly considered, there is certainly just ground for saying that a great number of the Candidates shewed proofs of having been extremely well taught."

"The industry which the whole plainly proves is a foundation on which anything whatever may be safely built. But any improvement to be sound must be not only gradual, but thoroughly assimilated to what already exists. The probability is that the schoolmasters will discover for themselves year after year what can be done in this direction better than others can point it out to them. What is most wanted at present is close attention to the subjects included under the preliminary examination."

(Paragraph 49).—. . . "The junior examination is *intended* not so much for the younger people of those schools which send Candidates to the senior examination, as *for schools of a different class—those, namely, which the scholars usually leave at about the age of 14*. It is believed that there are many of these schools, and that they are likely to avail themselves largely of the minor examinations, if the competition be not raised completely above their level; but it is obvious that they will have no chance in a race for distinction if their best pupils are always to compete with boys a year older. Hereafter it may be possible to persuade parents who send their children to schools of this class, not to remove them so early; but there seems reason to fear that the effect of immediately raising the age, would be to exclude these schools altogether. Not a few of the schoolmasters seem to be of this opinion, and the Delegates consider themselves bound to give the more weight to it because such schools are less likely than any others to make their voices heard."

BATH AND WEST OF ENGLAND SOCIETY

FOR THE ENCOURAGEMENT OF

Agriculture, Arts, Manufactures, and Commerce.

ESTABLISHED 1777.

RULES.

I. The Society shall consist of a President, Vice-Presidents, Council, Treasurer, Secretary, Governors, and Members, and shall have the following objects:—

1st. To hold meetings in the West of England for the exhibition of breeding stock, agricultural implements, and such other articles connected with agriculture, arts, manufactures, or commerce, as may be determined upon by the Council.

2nd. To offer premiums for essays and reports on subjects affecting the agriculture of the West of England, and to publish a Journal for circulation.

II. The West of England shall be divided into two districts, to be called the Eastern and Western.

III. The boundary line separating Devon from Somerset and Dorset shall be the division of such districts.

IV. The Council shall consist of a president, vice-presidents, and forty-eight other members (twenty-four of whom shall retire annually by rotation, but shall be eligible for re-election), and shall be elected by the whole body of members. One half of the Council, exclusive of the president and vice-presidents, shall be chosen from persons residing or representing property in the Eastern District, and the other half from persons residing or representing property in the Western District.

V. The election of President and Council shall take place at the annual meeting; and they shall enter into office at the conclusion of the annual meeting at which they have been chosen. The Council shall have power to nominate Vice-Presidents, and fill up such vacancies in their own body as may from time to time occur during the interval between the annual meetings.

VI. The entire management of the Society, including the power of making by-laws, of settling the prizes to be awarded, of nominating the committees, fixing the places of meetings, of appointing or removing the Treasurer, Secretary, and such other officers as may be required to carry on the business of this Society, shall be vested in the Council, who shall report their proceedings at the annual meeting to be held alternately in the Eastern and Western Districts, and submit them to the meeting for confirmation.

VII. The meetings for exhibitions shall be held in different towns in successive years, alternately in each district.

VIII. Every subscriber of 1*l.* annually shall be a member; of 2*l.*, a governor, and eligible for election as a vice-president; and every yeoman and tradesman subscribing 10*s.* and upwards annually shall be a member of the Society; and all shall be deemed such, and liable to pay their subscription, until they shall give notice in writing to the Secretary of their intention to withdraw. The subscriptions to become due and be paid in advance on the 1st of January in each year.

IX. The payment of 10*l.* in one sum shall constitute a member for life.

X. To entitle a member to exhibit, he must have been a member for six months, and have paid his subscription at least one month previous to the day of exhibition. Non-members will be permitted to exhibit stock, agricultural implements, or other articles, on payment of such a sum as the Council shall direct.

XI. Entries must be sent to the Secretary at least *sixty-two days* previous to the day of exhibition; who, upon their reception, shall forward by post printed forms of certificates to each exhibitor, which shall be filled up by him and returned to the Secretary at least *forty-eight days* previous to the day of exhibition.

XII. Members will be admitted to the exhibition without charge, by tickets (not transferable) to be issued by the Council; and other persons will be admitted on payment of such a sum as the Council shall direct.

XIII. The annual meetings of the Society shall be held in the months of May or June.

XIV. That if it be proved to the satisfaction of the Council that any person has attempted to gain a prize in this or any Agricultural Society by a false Certificate, or by a misrepresentation of any kind, such person shall thereupon be excluded from again exhibiting in this Society.

XV. All prizes shall be open for competition to the United King-

dom. But no exhibitor of stock, or person intending to compete for any of the Society's prizes, shall be privy to the selection of judges to award the premiums.

XVI. The proceedings of the Society, including the Prize Reports and List of Members, shall be printed annually, and every subscriber not in arrear with his subscription shall be entitled to receive one copy, free of expense, and there shall be an additional number printed for sale.

XVII. No new rule shall be proposed, or existing one altered or rescinded, excepting at an annual meeting, and then only provided a statement in writing shall have been sent to the Secretary at least twenty-eight days previously, setting forth the rule to be proposed, rescinded, or altered ; and in the last case the proposed alteration shall be stated.

XVIII. No subject or question of a political tendency shall ever be introduced at any meeting of this Society.

List of Officers.

PATRON.

THE MOST NOBLE THE MARQUIS OF LANSDOWNE.

VICE-PATRONS.

THE DUKE OF BEDFORD.	THE EARL FORTESCUE.
THE EARL OF MOUNT EDGE-CUMBE.	THE LORD PORTMAN.

PRESIDENT

FOR THE YEAR ENDING JUNE, 1859.

JOHN SILLIFANT, Coombe, Crediton.

VICE-PRESIDENTS.

ASHBURTON, LORD. ACLAND, SIR THOMAS DYKE, Bart. ACLAND, SIR P. P. F. P., Bart. ADDINGTON, THE HON. W. W. BURLINGTON, EARL OF. BOUVERIE, THE HON. P. PLEYDELL. BULLER, J. W., M.P. CAREW, W. P. CLINTON, LORD. CORK, EARL OF. DUNTZE, SIR J., Bart. DAVIE, SIR H. R. F., Bart., M.P. DEVON, EARL OF. DUCKWORTH, SIR J. T. B., Bart. DRAKE, SIR TRAYTON, Bart. DICKINSON, F. H. DIVETT, E., M.P. DURANT, R. EBBINGTON, LORD. FORTESCUE, EARL. FULFORD, BALDWIN. GRAY, BENJAMIN. GRENVILLE, RALPH NEVILLE. HEATHCOTE, J. HATTEY, SIR W. G., Bart., M.P.	HORNER, REV. JOHN. HIPPISELEY, JOHN (High-Sheriff of Devon). KENNAWAY, SIR JOHN, Bart. KING, R. K. M. KNYFTON, T. T. LOPES, SIR M., Bart., M.P. LOVELACE, EARL OF. LABOUCHERE, THE RIGHT HON. H., M.P. LANGTON, W. H. P. GORE, M.P. MOODY, C. A., M.P. MILES, WM., M.P. NORTHCOTE, SIR S. H., Bart., M.P. PICKWICK, MAJOR. PINNEY, WILLIAM, M.P. ST. GERMAN, EARL OF. SANFORD, E. A. SCOBELL, CAPT. R.N. STUCLEY, SIR G. S., Bart. TYRRELL JOHN. THROCKMORTON, SIR R. S., Bart. WHEELER, SIR TREVOR, Bart. WAIT, WILLIAM SAVAGE. WILLIAMS, C. C. WILTSHIRE, JOHN.
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LORD WARDEN of the STANNARIES.

The SURVEYOR-GENERAL of the DUCHY of CORNWALL.

The RECEIVER-GENERAL of the DUCHY of CORNWALL.

COUNCIL. (1858-1859.)

Eastern Division.

Elected.	Name.	Address.
1858	ADAIR, D. . . .	Heatherton, Taunton
1857	ANDREWS, G. H. . .	Rimpton, Sherborne
1857	BAILWARD, JOHN . .	Horsington, Wincanton
1858	BRAN, H. L. . . .	Ashcott
1857	BULLOCK, GEORGE . .	North Coker, Yeovil
1858	BUSH, CLEMENT . .	Weston, Bath
1858	COTTERELL, J. H. .	Bath
1858	CALDWELL, H. B. .	Chippenham
1856	DANGER, THOMAS . .	Huntville, Bridgwater
1858	GRAY, JOHN . . .	Kingweston, Somerton
1858	GRAY, JONATHAN . .	Summerhill House, Bath
1857	GILLET, W. E. . .	Taunton
1857	HANCOCK, J. D. . .	Halse, Taunton
1858	HARRIN, GEORGE . .	Newton House, Yeovil
1858	HOLE, JAMES . . .	Knowle, Dunster
1858	KING, J. WEBB . . .	Ash, Martock
1858	KNOLLYS, I. E. . .	Fitzhead, Taunton
1857	LUSH, JOSEPH . . .	Bruton
1857	MORLEY, THOMAS B. .	Cannington, Bridgwater
1857	MOYSEY, H. G. . .	Batheaton, Wellington
1857	PTTMAN, SAMUEL . .	Rumwell Lodge, Taunton
1857	POOLE, GABRIEL . .	Bridgwater
1857	SMITH, ROBERT . . .	Kmett's Grange, Southmol-
1857	THOMPSON, WM. . .	Bath. [ton]

Western Division.

Elected.	Name.	Address.
1857	ACLAND, T. D. . . .	Sprydoncote, Exeter
1857	BELFIELD, JOHN . .	Park Field, Torquay
1858	CLARKE, R. H. . . .	Bridwell, Collumpton
1858	DAVY, J. T. . . .	Rose Ash, South Molton
1858	DAW, J.	Exeter
1858	DREW, E. S. . . .	Collumpton
1857	FARRANT, M. . . .	Growing, Collumpton
1857	FROUDE, W. . . .	Dartington, Totnes
1858	FRET, JOHN	Woodgate, Wallington
1858	GORDON, C., Jun. . .	Wincombe Park, Hon-
1857	GOULD, J.	Kenton, Exeter [ton]
1857	HOOPER, JOHN . . .	Chagford
1857	HUSSEY, THOMAS . .	Waybrooke, Exeter
1858	LANGDON, GEO. . . .	Ashford, Barnstaple
1858	MAY, R.	Rewe, Exeter
1857	NEWMAN, T.	Mamhead, Exeter
1858	OLDREIVE, J. L. . .	Totnes
1857	PORTER, WM. . . .	Hembury Fort, Honiton
1857	PITTS, JAMES PITT . .	Newton House, Drew-
		steignton
1858	VIDAL, E. U.	Cornborough, Bideford
1858	WIDDICOMBE, J. . .	Torrhill, Ivybridge
1857	WIPPELL, WM. . . .	Rudway, Thoverson
1858	WALBORN, J. W. . .	Bradfield, Thoverson

REPORT OF THE COUNCIL,

Read at the Annual Meeting at CARDIFF, 3rd of June, 1858.

THE Council have again the satisfaction of reporting an increase in the number of Members, as shown by the following comparative statement :—

	Last Year.	At this time.
Governors	93	95
Life Members	41	43
Annual Subscribers	974	1038
	1108	1176

Since the last Annual Meeting the sum of 76*l.* has been distributed in prizes for Essays, as follows :—For Essays on the “Labourer,” to Messrs. Edward Spender, of Mannamead, Plymouth, and T. W. P. Isaac, of Bath ; for an Essay on “Cattle of the West of England,” to Mr. Henry Tanner, of Puddington Lodge, near Crediton ; the prize for the best Essays on “Beans and Peas” was divided between Mr. Wm. Brothers, of Belfast, and Professor John Donaldson, of London ; that for the best Essay on the “Threshing Machine” was awarded to Mr. Heard, of Leiston Works, Saxmundham ; the premium for the best Essay on the “Management of Dung” was divided between Messrs. Spender and Isaac and Mr. Henry Tanner ; and that for the best Essay on the “Roofing of Farm Buildings” was awarded to Mr. T. P. W. Isaac, of Bath, architect.

The Council deem it of great importance to maintain the efficiency of this branch of the Society’s operations, and they have issued the following offers of prizes for Essays, to be sent in for adjudication next year :—On Pigs, 15*l.* ; on Steam cultivation, 25*l.* ; on Potatoes, 10*l.* ; on the comparative value of cake, corn, and roots, in making flesh and manure, 20*l.* ; on Autumn Cultivation, 10*l.* ; on the Training of Farm Servants, 15*l.* ; and lastly, on a subject for which they hope that the present gathering will furnish fertile suggestions, “On the Connection, both Agricultural and Commercial, between the West of England and South Wales,” 20*l.*

After careful consideration, the Council have thought it for

the interest of the Society to again engage the services of Professor Brown, and he is accordingly acting as Veterinary Inspector at the Cardiff Meeting. Arrangements have been made in conjunction with this appointment, which, it is confidently hoped, will obviate difficulties, which have sometimes arisen in the selection of stock entitled to compete for prizes.

The Council desire specially to direct the attention of the members and friends of the Society to the financial statement published in the Journal.

The circumstance that the increase of members is not followed by a proportionate increase in the available resources of the Society has engaged the attention of the Council, and a Committee of their number has reported the result of an investigation of the subject. It appears that a considerable proportion of our members are of the class entitled to the privileges of the Society on payment of an annual subscription of ten shillings, which amount is almost, if not entirely returned in the form of a copy of the Journal, and free admissions to the show-yard and other privileges, leaving little, if any, balance applicable to general purposes. Many gentlemen, who might have claimed the advantages of membership, at 10s. per annum, have from the first subscribed double this amount, and several others have lately followed their example. The Council hope that many more may be encouraged to adopt the same course, as it is only by a permanent and substantial increase in its resources that the Society can be maintained in its present state of efficiency. The receipts for admission to the show-yard have hitherto proved a most important and annually improving branch of revenue, but it must be remembered that this is liable at any time to be seriously affected by the contingency of unfavourable weather and other causes.

Amongst the prizes offered for competition at the present Exhibition are a few specially applicable to the live stock of the district, and ponies of the Welsh breed, and Welsh cattle of any breed, in four classes.

One of the members of the Council, Mr. C. C. Williams, has also offered two prizes for cattle of any breed, bred in the districts of South Wales or Monmouthshire.

Through the liberality also of certain members of their body the Council have been enabled to add to these a few prizes for the best examples of the woollen fabrics of this district.

The present Exhibition has received contributions from 91 exhibitors of implements, viz., 16 from South Wales, 8 from Somerset, 14 from Devon, 0 from Cornwall, 5 from Gloucester, 0 from Dorset, 4 from Wilts, and 44 from other counties. The total number of articles in the implement department is 800, including two stands of manure.

Of stock there are 137 exhibitors, viz., 74 from South Wales, 15 from Somerset, 18 from Devon, 1 from Cornwall, 10 from Gloucester, 0 from Dorset, 6 from Wilts, and 13 from other counties.

The stock entered for exhibition includes: Bulls, 55; cows, 35; heifers, 56; steers, 6, making a total of 152 cattle. Rams, 149, and ewes, 226, being 375 sheep. Boars, 17, and sows, 42, making 59 pigs. Mares and fillies, 64; stallions and colts, 36, or 100 horses and ponies. The total head of stock is 686. In comparison with the numbers exhibited in similar classes last year this shows an increase of 167.

On the recommendation of the Implement Committee and their engineers, the Council think it right to add that they have adopted some new regulations, as conditions to be complied with by all exhibitors of steam engines, the result of which they hope will be to secure to the practical farmer the opportunity of witnessing in operation in the yard engines possessing greater simplicity and more permanent efficiency than heretofore.

In compliance with the hearty and cordial invitation received from the authorities of Barnstaple, the Council have selected that town for the Annual Meeting for 1859; and, judging from the united energy and zeal displayed on the occasion by the inhabitants of the North Devon, the Council confidently anticipate a most successful meeting in that highly interesting and beautiful locality.

Amongst their proceedings during the past year, the Council have the satisfaction of reporting the opening of what they trust will prove only to be the commencement of friendly intercourse with Societies in other countries, having kindred objects to promote. Appended to this report will be found a copy of a letter from the Agricultural Society of the State of Wisconsin, U.S. The volumes forwarded with this letter form an interesting and valuable addition to the library, and a set of the Society's Journal and other documents have been forwarded in return. The Council trust that the system of exchange thus commenced may be greatly extended. Such proceedings cannot but tend to strengthen the bond uniting the

interests of the two great Anglo-Saxon nations, and render yet more secure their amicable relations.

The Council suggest the appointment of John Sillifant, Esq., to the office of President for the ensuing year, and that of J. W. Buller, Esq., M.P., and R. K. M. King, Esq., as Vice-Presidents.

The following members of the Council retire from office by rotation :—

EASTERN DIVISION.—D. Adair, Heatherton, Taunton; H. L. Blair, Ashcott; J. H. Cotterell, Bath; Thomas Danger, Hunstile, Bridgwater; E. Dowding, Bath; John Gray, Kingweston, Somerton; Jonathan Gray, Summerhill, Bath; James Hole, Knowle, Dunster; J. Webb King, Chilton Polden, Bridgwater; R. K. M. King, Walford, near Taunton; J. E. Knollys, Fitzhead, Taunton; M. Raynes, Mells, Frome.

WESTERN DIVISION.—J. H. Amory, Tiverton; John Benson, Tavistock; J. W. Buller, M.P., Downes, Crediton; J. T. Davy, Rose Ash, South Molton; John Fry, Woodgate, Wellington; C. Gordon, Jun., Gittisham, Honiton; H. Trethewy, Gram-pound, Cornwall; E. U. Tidal, Cornborough, Bideford; J. Widdicombe, Torhill, Ivybridge. In this Division Messrs. R. H. Clarke, of Bridwell, Collumpton; R. May, of Rewe, Exeter; and J. L. Oldrieve, of Totness, also retire as having been elected last year to supply the places of gentlemen transferred to the list of Vice-Presidents, but who would otherwise have retired by rotation. The lamented decease of A. H. D. Troyte, Esq., also creates a vacancy in this division.

In the Eastern Division the Council recommend the election of Mr. Clement Bush, of Weston, near Bath; and Mr. Caldwell, of Lackham House, Wilts; and the re-election of Messrs. Adair, Bean, Cotterell, Danger, John Gray, Jonathan Gray, Hole, Webb King, J. E. Knollys, and J. H. Allen, of Lynford House, Taunton.

In the Western Division, the Council suggest the election of Sir J. Duntze, Bart., of Starcross; Mr. E. S. Drewe, of the Grange, Collumpton; Mr. Walrond, of Bradfield; Mr. Langford, of Ashford, near Barnstaple; Mr. Pitts, of Drewsteignton; and Mr. John Drew, Jun., of Powderham, near Exeter; and the re-election of the following gentlemen on retiring from the Western Division, viz.,—Messrs. Davy, Fry, Gordon, Vidal, Widdicombe, Clarke, May, and Oldrieve.

ENGLAND SOCIETY.

) 31st DEC., 1858.

PAYMENTS.		£. s. d.	£. s. d.
Balance due to the Treasurer	..	..	384 11 10
Expenses of former Meetings	..	..	172 15 2
Printing	182 6 9		
Stationery	27 13 0		
Advertising	41 17 6		
Catalogue	..	251 17 3	
Postage	..	5 0 0	
Carriage of Parcels	..	60 6 11	
Posting Bills	..	6 16 3	
Picture Headings to large Bills	..	35 11 6	
Sundries	..	31 1 0	
Expenses at Council Meetings	..	22 3 3	
Journal Printing, Advertising, and Distribution	..	20 5 6	
Plant, purchase and expenses of	..	298 10 9	
Chemical research, ...	..	384 6 10	
Salaries	..	50 0 0	
Subscription to Commercial and Literary Institution at Bath where Society's library and property are kept	..	165 10 0	
Gratuity to Superintendent of Cardiff Police	..	1 1 0	
Judges' Expenses out of pocket	..	5 5 0	
Prizes for Essays	..	60 12 6	
Prizes for Stock	..	85 0 0	
Prizes for Implements	484 0 0		
	139 0 0		
Poultry Contribution, or Grant to Poultry Show	..	623 0 0	
Portable Shedding	..	183 19 4	
Interest on Banker's loan	..	241 14 0	
Exhibition Expenses, viz.—		4 18 10	
Clerks	23 9 6		
Money-takers	19 13 0		
Messengers	10 3 8		
Labourers	57 8 3		
Police	76 3 0		
Stewards	14 0 8		
Secretary	9 12 5		
Director	7 4 0		
Engineer	17 11 0		
Band	125 15 0		
Horse Hire	43 18 6		
Fly ditto	17 0 6		
Lodgings	81 13 9		
Refreshment	137 6 4		
Fodder	107 14 9		
Shedding	783 2 4		
Trials	263 17 11		
Steam Plough	29 14 3		
Sundries	16 13 3		
		18 2 2 1	
		£4936 9 0	

CHEMICAL ANALYSES OF MANURES, &c.

*Terms on which the Society's Consulting Chemist, DR. A.
may be applied to by MEMBERS ONLY:—*

1. For advice on one topic
2. For an opinion as to the genuineness of a sample of Guano
3. Ditto ditto of Bone-dust
4. Ditto ditto of Oilcake
5. For determination of Ammonia in Guano or in other artificial Manures
6. For partial analysis of Guano
Such an analysis, except in cases of disputes, is sufficient to determine the commercial value of a sample of Guano.
7. For a complete analysis of Guano
8. For determination of soluble and insoluble Phosphate of Lime in a sample of Superphosphate
9. For a full analysis of a sample of Superphosphate
10. For analysis of Nitrate of Soda
11. Ditto of Sulphate of Ammonia
12. Ditto of Oilcake
13. Ditto of Oilcake, including determination of Oil
14. For a determination of Lime in a Soil
15. For determination of Lime, Sand, Organic Matter, and Clay in a Soil
16. For a partial analysis of a Soil
17. For a full analysis of a Soil
18. For partial analysis of a Limestone, Marl, or similar Mineral
19. For complete analysis of Limestone, Marl, &c.
20. For determination of Carbonate of Lime or Gypsum in Water
21. For partial analysis of Water
22. For complete analysis of Water

Samples for examination to be sent free of charge.

Members wishing to exercise their privilege on the above-named if they please, forward their samples for examination *by parcel*, to PROFESSOR VOELCKER, Royal Agricultural College, Cirencester. The Professor's fee must be paid in advance, by Post-office order. But as in some cases information may be desired which is not in the above list, members will do well to ascertain the expenses about to incur by communication with the Professor.

Samples of manures are best sent in tin canisters: $\frac{1}{2}$ lb. to

Award of Prizes

AT THE

MEETING HELD AT CARDIFF, GLAMORGANSHIRE,

ON THE 2ND, 3RD, AND 4TH OF JUNE, 1858.

*Judges for Devon, Hereford, and
Welsh Cattle.*

Mr. S. TRESAWNA, Lamellyn, Probus,
Cornwall.
Mr. EDWARD PRICE, Pembridge, Leominster.
Mr. G. R. TURNER, Coombe, Sydenham, Taunton.

*Judges for Shorthorn Cattle and
Short-wool Sheep.*

Mr. EDWARD LITTLE, Chippenham.
Mr. ROBERT SPILLER, Branscombe, Sidmouth.
Mr. EDWARD SQUAREY, Odstock, Salisbury.

Judges for Long-woolled Sheep.

Mr. ROBERT SMITH, Emmett's Grange, Exmoor.
Mr. ROBERT MAY, Rewe, Exeter.
Mr. SPENCER, Lutterworth, Leicester.

Judges for Horses, Ponies, and Pigs.

Mr. JOHN MOORE, Whitchurch, Hants.
Mr. JOHN WIPPELL, Exminster.
Mr. G. BROWN, Avebury, Wilts.

CATTLE.**DEVONS.**

CLASS 1.—For the best Bull, above three years old on 1st June, 1858, a Silver Cup.

The Prize awarded to Mr. THOMAS WEBBER, of Halberton Court, in the county of Devon, for his Devon Bull. Bred by himself.

CLASS 2.—For the best Bull, not exceeding three years old on 1st June, 1858, 12*l*. Second ditto, 5*l*.

First Prize awarded to Mr. RICHARD CORNER, of Torweston, Williton, in the county of Devon, for his Devon Bull. Bred by himself.

Second Prize awarded to M. GODFREY, Esq., of Ruperra Castle, Cardiff, in the county of Glamorgan, for his Devon Bull. Bred by Sir C. Morgan, Bart., of Tredegar Park, Newport.

Commended, No. 3, Capt. J. T. DAVY, of Rose Ash, South Molton, in the county of Devon, for his Devon Bull.

CLASS 3.—For the best Bull, not exceeding two years old on 1st June, 1858, 10*l*. Second ditto, 5*l*. Third ditto, 3*l*.

First Prize awarded to Mr. JAMES MERSON, of Brinsworthy, North Molton, in the county of Devon, for his Devon Bull. Bred by himself.

Second Prize awarded to Mr. THOMAS WEBBER, of Halberton Court, Tiverton, in the county of Devon, for his Devon Bull. Bred by himself.

Third Prize awarded to JAMES W. BULLER, Esq., M.P., of Downes, Crediton, in the county of Devon, for his Devon Bull. Bred by himself.

4.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the Exhibition), 8*l*. Second ditto, 4*l*.

1st Prize awarded to Mr. JAMES MERSON, of Brinsworthy, North Molton, county of Devon, for his Devon Cow. Bred by Mr. R. Merson.

2nd Prize awarded to Mr. JAMES DAVY, of Flitton, North Molton, in the county of Devon, for his Devon Cow. Bred by himself.

3rd Prize awarded to Capt. J. T. DAVY, of Rose Ash, South Molton, in the county of Devon, for his Devon Cow.

5.—For the best Heifer in Calf or in Milk, not exceeding three years old on 1st June, 1858, 8*l*. Second ditto, 4*l*.

1st Prize awarded to THOMAS STRONG, of Dunchideock Farm, Exeter, in the county of Devon, for his Devon Heifer.

2nd Prize awarded to Mr. JAMES DAVY, of Flitton, North Molton, in the county of Devon, for his Devon Heifer. Bred by himself.

3rd Prize awarded to Mr. THOMAS STRONG, of Dunchideock Farm, Exeter, county of Devon, for his Devon Heifer.

6.—For the best Pair of Heifers, not exceeding two years old on 1st June, 1858, belonging to the same owner, 8*l*. Second ditto, 4*l*.

1st Prize awarded to JAMES W. BULLER, Esq., M.P., of Downes, Crediton, county of Devon.

2nd Prize awarded to Mr. JAMES MERSON, of Brinsworthy, North Molton, county of Devon.

SHORT-HORNS.

7.—For the best Bull above three years old on 1st June, 1858, a Silver Cup.

1st Prize awarded to Mr. JOHN LOGAN, of Maindy House, Newport, Monmouthshire.

2nd Prize awarded to Capt. BLATHWATT, of Dyrham, Chippenham.

8.—For the best Bull, not exceeding three years old on 1st June, 1858, 12*l*. Second ditto, 5*l*.

1st Prize awarded to Mr. R. STRATTON, of Broad Hinton, Swindon, Wilts.

2nd Prize awarded to the Hon. P. P. BOUVERIE, of Brymore, Bridgwater, Somerset.

9.—For the best Bull, not exceeding two years old on 1st June, 1858, 10*l*. Second ditto, 8*l*.

1st Prize awarded to Mr. WILLIAM HEWER, of Sevenhampton, Highworth, county of Wilts.

2nd Prize awarded to Mr. R. STRATTON, of Broad Hinton, Swindon, county of Wilts.

3rd Prize awarded to Mr. EDWARD HOLLAND, of Dumbleton Hall, Evesham, county of Warwick.

10.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the Exhibition), 10*l*. Second ditto, 4*l*.

1st Prize awarded to Mr. RICHARD STRATTON, of Broad Hinton, Swindon, county of Wilts.

2nd Prize awarded to Mr. RICHARD STRATTON, same as above.

3rd Prize awarded to Mr. EDWARD BOWEN, of Biddington House, county of Gloucestershire.

CLASS 11.—For the best Heifer in Calf or in Milk, not exceeding three years old on the 1st June, 1858, 8*l*. Second ditto, 4*l*.

First Prize awarded to Mr. RICHARD STRATTON, of Broad Hinton, Swindon, Wilts.

Second Prize awarded to Mr. JOHN BAYNTON STARKY, of Spyepark, Chippenham, Wilts.

Highly commended, No. 66, Mr. JOHN GARSED, of the Moorlands, Cowbridge. No. 67, Mr. JOHN LOGAN, of Maindee House, Newport, Monmouthshire. No. 72, Mr. JOHN SHATTOCK, of Parsonage Farm, Long Ashton, Bristol.

Commended, No. 62, Mr. RICHARD STRATTON, of Broad Hinton, Swindon, Wilts.

CLASS 12.—For the best Pair of Heifers, not exceeding two years old on 1st June, 1858, belonging to the same owner, 8*l*. Second ditto, 4*l*.

First Prize awarded to Mr. RICHARD STRATTON, of Broad Hinton, Swindon, Wilts.

Second Prize awarded to Mr. JOHN LOGAN, of Maindee House, Newport, Monmouthshire.

HEREFORDS.

CLASS 13.—For the best Bull, above three years old on 1st June, 1858, a Silver Cup.

The Prize awarded to the Right Hon. Lord BATEMAN, of Shobdon Court, Leominster, Herefordshire.

Highly commended, No. 85, the TREDEGAR IRON COMPANY, of the Iron Works, Newport, Monmouthshire.

Commended, No. 86, Mr. WILLIAM TAYLOR, of Showle Court, Ledbury, Herefordshire.

CLASS 14.—For the best Bull, not exceeding three years old on 1st June, 1858, 12*l*. Second ditto, 5*l*.

First Prize awarded to Mr. REES KEENE, of Pencraig, Caerleon, Monmouthshire.

Second Prize awarded to Mr. WILLIAM TAYLOR, of Showle Court, Ledbury, Herefordshire.

CLASS 15.—For the best Bull, not exceeding two years old on 1st June, 1858, 10*l*. Second ditto, 5*l*.

First Prize awarded to Mr. WILLIAM PERRY, of Cholstrey, Leominster, Herefordshire.

Second Prize awarded to Mr. W. C. MORRIS, of Whitwick, Lower Eggleton, Ledbury, Herefordshire.

CLASS 16.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the Exhibition), 8*l*. Second ditto, 4*l*.

First Prize awarded to Mr. HENRY MORGAN, of Mamhilad House, Abergavenny, Monmouthshire.

Second Prize awarded to Mr. REES KEENE, of Pencraig, Caerleon, Monmouthshire.

Highly commended, No. 100, Mr. WARREN EVANS, of Llandowlaa, Uske, Monmouthshire.

CLASS 17.—For the best Heifer in Calf or in Milk, not exceeding three years old on 1st June, 1858, 8*l*. Second ditto, 4*l*.

First Prize awarded to Mr. WILLIAM PERRY, Cholstrey, Leominster, Herefordshire.

Second Prize awarded to Mr. WILLIAM PERRY, Cholstrey, Leominster, Herefordshire.

CLASS 18.—For the best Pair of Heifers, not exceeding two years old on 1st June, 1858, belonging to the same owner, 8*l*. Second ditto, 4*l*.

First Prize awarded to the Right Hon. Lord BATEMAN, of Shobdon Court, Leominster, Herefordshire.

Second Prize awarded to Mr. WILLIAM WILLIAMS, of Red House, Ely, Cardiff, Glamorganshire.

Commended, No. 111, Mr. REES KEENE, of Pencraig, Caerleon, Monmouthshire.

SHEEP.

LEICESTER, OR LONG-WOOLLED.

(Not qualified to compete as Cotswold.)

CLASS 19.—For the best Yearling Ram, 6*l*. Second ditto, 4*l*. Third ditto, 2*l*.

First Prize awarded to Mr. JOHN BODLEY, of Stockleigh Pomeroy, Crediton, Devon.

Second Prize awarded to Mr. JOHN PARTRIDGE, of Bow, Crediton, Devon.

Third Prize awarded to Mr. THOMAS POTTER, of Yellowford, Thorverton, Devon.

CLASS 20.—For the best Ram of any other age, 5*l*. Second ditto, 3*l*.

First Prize awarded to Mr. JOHN PARTRIDGE, of Bow, Crediton, Devon.

Second Prize awarded to Mr. JOHN GREGORY WATKINS, of Woodfield, Imbersley, Worcester.

Highly commended, No. 158, Mr. SAMUEL KINGDON, of Lynch, Thorverton, Devon.

CLASS 21.—For the best pen of five Ewes, 4*l*.

The Prize awarded to Mr. SAMUEL KINGDON, of Lynch, Thorverton, Devon.

CLASS 22.—For the best pen of Two-teeth Ewes, 5*l*. Second ditto, 3*l*. Third ditto, 2*l*.

First Prize awarded to Mr. R. CORNER, of Torweston, Williton, Taunton, Somersetshire.

Second Prize awarded to JAMES W. BULLER, Esq., M.P., of Downes, Crediton, Devon.

Third Prize not awarded.

COTSWOLD.

CLASS 23.—For the best Yearling Ram, 5*l*. Second ditto, 3*l*.

First Prize awarded to Mr. THOMAS B. BROWNE, of Hampden, Andoversford, Heltenham, Gloucestershire.

Second Prize awarded to Mr. EDWARD HANDY, of Sierford, Cheltenham, Gloucestershire.

CLASS 24.—For the best Ram of any other age.

First Prize awarded to Mr. EDWARD HANDY, of Sierford, Cheltenham, Gloucestershire.

Second Prize awarded to Mr. JOHN K. TOMBS, of Langford, Lechlade, Gloucestershire.

CLASS 25.—For the best pen of five Ewes, 4*l*.

The Prize awarded to Mr. WILLIAM SMITH, of Bibury, Fairford, Gloucestershire.

CLASS 26.—For the best pen of Two-teeth Ewes, 5*l*. Second ditto, 3*l*.

First Prize awarded to Mr. THOMAS B. BROWNE, of Hampden, Andoversford, Cheltenham, Gloucestershire.

Second Prize awarded to Mr. WILLIAM SMITH, of Bibury, Fairford, Gloucestershire.

COTSWOLD DOWN OR OXFORD DOWN.

CLASS 27.—For the best Yearling Ram, 4*l*. Second ditto, 2*l*.

First Prize awarded to Mr. WILLIAM HEMMING, of Coldicot, Moreton-in-the-Marsh, Gloucestershire.

Second Prize awarded to Mr. JOHN K. TOMBS, of Langford, Lechlade, Gloucestershire.

CLASS 28.—For the best pen of five Two-teeth Ewes, 4*l*. Second ditto, 2*l*.

First Prize awarded to Mr. JOHN K. TOMBS, of Langford, Lechlade, Gloucestershire.

SOUTHDOWNS.

CLASS 29.—For the best Yearling Ram, 5*l*. Second ditto, 3*l*.

First Prize awarded to Mr. RALPH NEVILLE GRENVILLE, of Butleigh Court, Glastonbury.

Second Prize awarded to his Grace the DUKE of BEAUFORT, of Badminton, Chippenham, Wilts.

CLASS 30.—For the best Ram of any other age, 4*l*. Second ditto, 3*l*.

First Prize awarded to his Grace the DUKE of BEAUFORT, of Badminton, Chippenham, Wilts.

Second Prize awarded to his Grace the DUKE of BEAUFORT, of Badminton, Chippenham, Wilts.

CLASS 31.—For the best pen of five Ewes, 4*l*.

The Prize awarded to his Grace the DUKE of BEAUFORT, of Badminton, Chippenham, Wilts.

CLASS 32.—For the best pen of five Two-teeth Ewes, 5*l*. Second ditto, 2*l*.

First Prize awarded to Mr. WILLIAM LUCAS, of East Coker, Yeovil, Somerset.

Second Prize awarded to his Grace the DUKE of BEAUFORT, of Badminton, Chippenham, Wilts.

SHROPSHIRE DOWN OR HAMPSHIRE DOWN.

(Not qualified to compete as Southdowns.)

CLASS 33.—For the best Yearling Ram, 4l. Second ditto, 2l.

First Prize awarded to Mr. JOHN MOORE, of Littlecott Farm, Pewsey, Wilts.
Second Prize awarded to Mr. JOHN MOORE, of Littlecott Farm, Pewsey, Wilts.

CLASS 34.—For the best Ram of any other age, 3l. Second ditto, 2l.

First Prize awarded to Mr. GEORGE TRAHERNE, of St. Hilary, Cowbridge, Glamorganshire.

Second Prize awarded to Mr. JOHN GARBED, of the Moorlands, Cowbridge, Glamorganshire.

CLASS 35.—For the best pen of five Ewes, 4l.

The Prize awarded to Mr. GEORGE HARBIN, of Newton House, Yeovil, Somerset.

CLASS 36.—For the best pen of Two-teeth Ewes, 4l. Second ditto, 2l.

First Prize awarded to Mr. GEORGE HARBIN, of Newton House, Yeovil, Somerset.

Second Prize awarded to Mr. JOHN MOORE, of Littlecott Farm, Pewsey, Wilts.

SOMERSET AND DORSET HORNS.

CLASS 37.—For the best Yearling Ram, 5l. Second ditto, 3l.

First Prize awarded to Mr. THOMAS DANGER, Huntstile, Bridgwater, Somerset.

Second Prize awarded to Mr. THOMAS DANGER, Huntstile, Bridgwater, Somerset.

CLASS 38.—For the best Ram of any other age, 3l. Second ditto, 2l.

First Prize awarded to Mr. THOMAS DANGER, Huntstile, Bridgwater, Somerset.

Second Prize not awarded.

CLASS 39.—For the best pen of five Ewes, 4l.

The Prize awarded to Mr. WILLIAM TEMPLEMAN, of North Perrott, Crewkerne, Somerset.

CLASS 40.—For the best pen of five Two-teeth Ewes, 5l. Second ditto, 3l.

First Prize awarded to Mr. ROBERT TEMPLEMAN, of North Perrott, Crewkerne, Somerset.

Second Prize awarded to Mr. THOMAS DANGER, of Huntstile, Bridgwater, Somerset.

MOUNTAIN SHEEP.

CLASS 41.—For the best Ram of any age, 4l. Second ditto, 2l.

First Prize awarded to Mr. JAMES MERSON, of Brinsworthy, North Molton, Devon.

Second Prize, awarded to Mr. JAMES MERSON, of Brinsworthy, North Molton, Devon.

Commended, No. 272, Sir T. D. ACLAND, Bart., of Killerton, Exeter, Devon ;
No. 282, Mr. JAMES MERSON, of Brinsworthy, North Molton, Devon.

CLASS 42.—For the best pen of five Ewes of any age, 4l. Second ditto, 2l.

First Prize awarded to Mr. JAMES MEBSON, of Brinsworthy, North Molton, Devon.

Second Prize awarded to Mr. JAMES MEBSON, of Brinsworthy, North Molton, Devon.

Commended, Nos. 284, 285, Sir T. D. ACLAND, Bart., of Killerton, Exeter, Devon.

H O R S E S.

FOR AGRICULTURAL PURPOSES.

CLASS 43.—For the best Mare and Foal, or in Foal, 10l. Second ditto, 5l.

First Prize awarded to Mr. WILLIAM LOWRIE, of Cadoxton-juxta-Barry.

Second Prize awarded to Mr. JOHN LOGAN, of Maindee House, Newport, Monmouthshire.

CLASS 44.—For the best Two-Years-old Colt, 10l. Second ditto, 5l.

First Prize awarded to Mr. JOHN LOGAN, of Maindee House, Newport, Monmouthshire.

Second Prize awarded to Mr. HENRY HITCHCOCK, of Chitterne All Saints, Heytesbury, Wiltshire.

CLASS 45.—For the best Two-Years-old Filly, 5l. Second ditto, 3l.

First Prize awarded to Mr. WILLIAM LOWRIE, of Cadoxton-juxta-Barry.

Second Prize awarded to Messrs. LEWELLYN and HENRY THOMAS, of Tydraw Llantrythyd, Cowbridge.

CLASS 46.—For the best Yearling Colt or Filly, 5l. Second ditto, 3l.

First Prize awarded to Mr. EDWARD HOLLAND, of Dumbleton Hall, Evesham, Worcester.

Second Prize awarded to Mr. JOHN LOGAN, of Maindee House, Newport, Monmouthshire.

Commended, No. 318, Mr. WILLIAM LOWRIE, of Cadoxton-juxta-Barry.

FOR HACKS OR HUNTERS.

CLASS 47.—For the best Mare and Foal, or in Foal, 5l. Second ditto, 3l.

First Prize awarded to Mr. H. ENTWISLE, of Marlborough Grange, Cowbridge, Glamorganshire.

Second Prize awarded to B. H. CUTHBERTSON, Esq., Cefn Llech, Llangibby, Monmouthshire.

CLASS 48.—For the best Two or Three-Years-old Filly, 5l. Second ditto, 3l.

First Prize awarded to Mr. HAMILTON BAILLIE, of Ash Hall, Cowbridge, Glamorganshire.

Second Prize awarded to T. W. B. BLAKEMORE, Esq., M.P., of Velindre House, Cardiff, Glamorganshire.

CLASS 49.—For the best Yearling Colt or Filly, 5*l*. Second ditto, 3*l*.
First Prize awarded to Mr. WILLIAM WILLIAMS, Zealand, Bridgend, Glamorganshire.

Second Prize awarded to Mr. HUGH ENTWISLE, of Marlborough Grange, Cowbridge, Glamorganshire.

Commended, No. 343, the Rev. G. F. HODSON, of North Petherton, Bridgwater, Somerset; No. 349, Mr. HAMILTON BAILLIE, of Ash Hall, Cowbridge, Glamorganshire.

CLASS 50.—For the best Two or Three-Years-old Colt or Gelding, 4*l*.
Second ditto, 2*l*.

First Prize awarded to Mr. JAMES BALLARD, of Llwyn Hily House, Cowbridge, Glamorganshire.

Second Prize awarded to Mr. JAMES WATSON, of St. Fagan's, Cardiff, Glamorganshire.

PONIES.

CLASS 51.—For the best Mare Pony of any breed, not exceeding fourteen hands high, 4*l*. Second ditto, 2*l*.

First Prize awarded to Mr. G. M. TRAHERNE, of St. Hilary, Cowbridge, Glamorganshire.

Second Prize awarded to Mr. THOMAS THOMAS, of St. Hilary, Cowbridge, Glamorganshire.

CLASS 52.—For the best Mare Pony of any breed, not exceeding thirteen hands high, 4*l*. Second ditto, 2*l*.

First Prize awarded to Mr. JOHN WILLIAMS, of Splott House, Cardiff, Glamorganshire.

Second Prize awarded to Mr. W. LEYSHON, of Bridgend.

Highly commended, No. 382, the Rev. C. J. C. BULTEEL, of Holbeton Vicarage, Devon.

CLASS 53.—For the best Stallion Pony of the Welsh breed, not exceeding fourteen hands high, 5*l*. Second ditto, 3*l*.

First Prize awarded to THOMAS W. B. BLAKEMORE, Esq., of Valindra House, Cardiff, Glamorganshire.

Second Prize awarded to Mr. ROBERT GRIFFITHS, of Sigginstone.

Highly commended, No. 385, Mr. HENRY ANTHONY, of Pandy, Caerphilly, Glamorganshire; No. 388, Mr. P. JAMES, of Chepstow, Monmouthshire.

PIGS.

LARGE BREED.

CLASS 54.—For the best Boar, not exceeding two years old on 1st January, 1858, 4*l*. Second ditto, 2*l*.

First Prize awarded to Mr. WILLIAM HEWER, of Sevenhampton, Highworth, Wilts.

Second Prize awarded to Mr. WILLIAM HEWER, of Sevenhampton, Highworth, Wilts.

CLASS 55.—For the best Breeding Sow in Farrow, or that has farrowed within four months of the day of the Exhibition, 4*l*. Second ditto, 2*l*.

First Prize awarded to Mr. EDWARD BOWLEY, of Liddington House, Cirencester, Gloucestershire.

Second Prize awarded to Sir ROBERT G. THROCKMORTON, Bart., of Buckland, Faringdon, Berkshire.

Highly commended, No. 400, Messrs. BROGDEN and SONS, of Tondae Iron Works, Bridgend, Glamorganshire.

Commended, No. 398, Mr. R. N. GRENVILLE, of Butleigh Court, Glastonbury, Somerset.

CLASS 56.—For the best pen of three Breeding Sows, not exceeding nine months old on 1st June, 1858, 3*l*. Second ditto, 2*l*.

First Prize awarded to Mr. WILLIAM HEWER, of Sevenhampton, Highworth, Wilts.

Second Prize awarded to Mr. WILLIAM HEWER, of Sevenhampton, Highworth, Wilts.

Commended, No. 408, Mr. WILLIAM HEWER, of Sevenhampton, Highworth, Wilts.

SMALL BREED.

CLASS 57.—For the best Boar, not exceeding two years old on 1st January, 1858, 4*l*. Second ditto, 2*l*.

First Prize awarded to the Rev. G. F. HODSON, of North Petherton, Bridgwater, Somerset.

Second Prize awarded to the Rev. G. F. HODSON, of North Petherton, Bridgwater, Somerset.

CLASS 58.—For the best Breeding Sow in Farrow, or that has farrowed within four months of the Exhibition, 4*l*. Second ditto, 2*l*.

First Prize awarded to the Rev. G. F. HODSON, of North Petherton, Bridgwater, Somerset.

Second Prize awarded to the Rev. G. F. HODSON, of North Petherton, Bridgwater, Somerset.

CLASS 59.—For the best pen of three Breeding Sows, not exceeding nine months old, on 1st June, 1858, 3*l*. Second ditto, 2*l*.

First Prize awarded to Mr. LLEWELLYN WILLIAMS, of High-street, Merthyr, Glamorganshire.

Second Prize awarded to Mr. JOHN HOMFRAY, of Penlline Castle, Cowbridge, Glamorganshire.

WELSH CATTLE.

ANY BREED.

CLASS 60.—For the best Bull, not exceeding three years old on 1st June, 1858, 6*l*. Second ditto, 3*l*.

First Prize, no entry.

Second Prize, no entry.

CLASS 61.—For the best Bull, not exceeding two years old on 1st June, 1858, 5*l*. Second ditto, 3*l*.

First Prize, no entry.

Second Prize, no entry.

CLASS 62.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the Exhibition), 5*l*. Second ditto, 2*l*.

First Prize, no merit.

Second Prize, no merit.

CLASS 63.—For the best Heifer in Calf or in Milk, not exceeding three years old on 1st June, 1858, 4*l*. Second ditto, 2*l*.

First Prize not awarded.

Second Prize awarded to Mr. GEORGE GOODE, of Croft Cottage, Caermarthen.

SPECIAL PRIZE (ANY BREED). Offered by C. C. WILLIAMS, Esq.

CLASS 64.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the Exhibition).

The Prize awarded to Mr. REES KEENE, of Pencraig, Caerleon, Monmouthshire.

Commended, No. 433, Mr. JOHN LOGAN, of Maindee House, Newport, Monmouthshire.

CLASS 65.—For the best pair of Steers, not exceeding three years old on 1st June, 1858, 5*l*.

The Prize awarded to Sir CHARLES MORGAN, Bart., of Tredegar Park, Newport, Monmouthshire.

Commended, No. 441, Mr. HUGH ENTWISLE, of Marlborough Grange, Cowbridge, Glamorganshire; No. 442, Mr. REES KEENE, of Pencraig, Caerleon, Monmouthshire.

EXTRA STOCK AWARDS.

A Prize of 2*l*. awarded to Mr. JAMES C. WALL, of Redland Lodge, Bristol.

A Prize of 1*l*. awarded to Mr. HUGH ENTWISLE, of Marlborough Grange, Cowbridge, for his Short-horn Cow and Calf.

A Prize of 2*l*. awarded to Mr. JOHN LOGAN, of Maindee House, Newport, for his Short-horn Cow.

A Prize of 1*l*. awarded to the TREDEGAR IRON COMPANY, Newport, for their Hereford Heifer.

A Prize of 2*l*. awarded to Sir CHARLES MORGAN, Bart., of Tredegar Park, Newport, Monmouth, for his pair of Short-horn Heifers.

Award of Prizes FOR IMPLEMENTS.

The Judges of Implements in the Field were:—

Mr. CLARE SEWELL READ, Stoke Ferry, Brandon.	Mr. H. B. CALDWELL, Brandon.
Mr. JOHN CLARK, Wisbeach.	Mr. OWEN WALLACE, Northampton.
Mr. WILLIAM LISTER, Richmond.	Mr. THOMAS SCOTT, Ripon.

Engineers.

Mr. W. GOOCH, Great Western Railway, Swindon.	Mr. EDWARD EASTON, Grove, Southwark.
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PREPARATION OF GROUND.

Class.

1. For the best application of Steam-power to the Cultivation of Land, 25*l*. No competition.
2. For the best Plough for general purposes, 3*l*. ; to Messrs. J. and R. WRIGHT, Sandford, near Crediton, Devon.
3. For the best Subsoil Plough, 2*l*. ; to Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
4. For the best Turnwrest Plough, which will efficiently turn the furrow against the hill, 3*l*. ; to Mr. JOHN EDDY, Kennford, near Exeter, Devon.
5. For the best Cultivator, Grubber, and Scarifier (wide), 2*l*. ; to Mr. RICHARD COLEMAN, Chelmsford, Essex.
6. For the best ditto (narrow), 2*l*. ; to RICHARD COLEMAN, Chelmsford, Essex.
7. For the best Single or Double Drag, 1*l*. ; to Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
8. For the best set of Harrows, 1*l*. ; to Messrs. A. and T. FRY, Temple-gate, Bristol.
9. For the best set of Seed Harrows, 1*l*. ; to Messrs. J. and R. WRIGHT, Sandford, near Crediton, Devon.
10. For the best Chain Harrow, 1*l*. ; to Mr. W. C. CAMBRIDGE, Bristol.
11. For the best Clod Crusher or Pulverizer, 2*l*. ; to Mr. W. C. CAMBRIDGE, Bristol.

SECTION 2.—CULTIVATION OF CROPS.

12. For the best Corn Drill, 5*l*. ; to Mr. HUGH BIRD, Cardiff, Glamorgan.
13. For the best Corn Drill, for small occupations, in hilly districts, 5*l*. ; withheld.
14. For the best Turnip and Mangold-wurtzel Drill, for ridge or flat, depositing Manure with the Seed, 5*l*. ; to Messrs. R. and J. REEVES, Westbury, Wilts.
15. For the best General Drill, capable of Distributing at pleasure Liquid Manure with the Seed, 5*l*. ; no machine complied with the conditions of this Prize.
16. For the best General Manure Distributor, 5*l*. ; to Messrs. REEVES, Westbury, Wilts.
17. For the second best ditto, 2*l*. ; the Prize withheld.

Class.

18. For the best Horse Hoe for green crops on the ridge and flat, 1*l.*; to Mr. HUGH CARSON, Warminster, Wilts.
19. For the best ditto on steep hill-sides, specially adapted to work horizontally along the side of the hill, 2*l.*; to Mr. HUGH CARSON, of Warminster, Wilts.
20. For the best Machine for setting out Turnips on the ridge or flat, preparatory to singling, 3*l.*; to JOHN EATON, Twywell Works, Kettering, Northampton.
21. For the best Hand Machine for filling up vacancies in drilled Green Crops, 1*l.* No entry.

SECTION 3.—HARVESTING CROPS, AND PREPARING FOR MARKET.

22. For the best Hay-making Machine, 2*l.*; to Messrs. SMITH and ASHBY, of Stamford, Lincoln.
23. For the most economical and practically useful Portable Steam-engine, 10*l.*; to Messrs. BROWN and MAY, Devizes, Wilts.
24. For the second best ditto, 5*l.*; to Mr. W. C. CAMBRIDGE, Bristol.
25. For the Portable Combined Steam Threshing Machine which shall perfectly prepare the sample for market, 10*l.*; to Messrs. HUMPHRIES, of Pershore, Worcester.
26. For the most simple and practically useful Portable Combined Steam Threshing Machine, not requiring more than Eight-Horse Power, which shall make the best subdivisions of Corn and Refuse, 5*l.*; to Messrs. HUMPHRIES, Pershore, Worcester.
27. For the most practically useful Portable Threshing Machine, with Riddle and Straw-Shaker, not requiring more than 3½-Horse Power, when worked independently of its horse-gear, 3*l.*; to Mr. H. BEARE, Newton Abbott, Devon.
28. For the best Portable Four-Horse Gear, adapted for driving Threshing Machines, 2*l.*; to Mr. H. BEARE, of Newton Abbott, Devon.
29. For the best Single-Horse Gear for driving Chaff Cutters, &c., 1*l.*; to Messrs. A. and T. FRY, Bristol.
- 30, 31, 32. No entry.
33. For the best Winnowing Machine, which shall be also convertible into a simple Blower, 3*l.*; to Messrs. BURROW and PAGE, Morchard Bishop, Devon.
34. For the best One-Horse Cart for general purposes, 2*l.*; divided between Messrs. MILFORD and SONS, and Mr. GEO. MILFORD, both of Thorverton, Devon.
35. For the best Two-Horse Waggon, provided with efficient means of checking its speed down-hill without dragging or locking the wheels, 2*l.*; divided between Messrs. MILFORD and SONS, and Mr. GEORGE MILFORD, both of Thorverton, Devon.

SECTION 4.—PREPARATION OF FOOD FOR STOCK.

36. For the best Chaff Cutter, worked by Horse or Steam Power, 2*l.*; to Mr. H. CARSON, Warminster.
37. For the best Machine for Grating or Pulping Roots, 2*l.*; to Mr. E. H. BENTALL, Heybridg, near Maldon, Essex.
38. For the best Turnip Cutter, 1*l.*; equally divided between Messrs. A. and T. FRY, of Temple Gate, Bristol, and Mr. H. BIRD, Cardiff, Glamorgan.
39. For the best Corn and Pulse Bruiser, worked by Horse or Steam Power, 2*l.*; to Messrs. E. R. and F. TURNER, Ipswich, Suffolk.

Class.

40. For the best Oilcake Crusher, for every description of Cake, 1*l.*; to Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
41. For the best Gorse Bruiser or Chopper, 2*l.*; to Messrs. RICHMOND and CHANDLER, of Salford, near Manchester.
42. For the best and most economical Steaming Apparatus for preparing Food for Cattle, Pigs, &c., 2*l.*; to Messrs. RICHMOND and CHANDLER, of Salford, near Manchester.

SECTION 5.—MISCELLANEOUS.

43. For the best Churn, 1*l.*; to Mr. HUGH BIRD, of Cardiff, Glamorgan.
44. For the best Cheese-Press, 1*l.*; to Messrs. CARSON and SON, of Warminster, Wilts.
45. For the best Cooking Apparatus for Farm Kitchens, 2*l.*; to Mr. JOHN GLIDDON, of Williton, Taunton, Somerset.
46. For the best Field Gate, not less than nine feet in length, fitted with Hangings and Fastenings, 1*l.*; to Mr. SAMUEL ROUSELL, of Buckland St. Mary, Somerset.
47. For the best specimen of Substantial Fencing, calculated to resist Cattle of all kinds, constructed either of Iron, Wood, or a combination of both materials, fixed or moveable, 1*l.* No award.
48. For the best Self-Acting Valve for the discharge of small streams into tidal rivers. No merit.

SPECIAL PRIZES.

OFFERED BY CHARLES CROFT WILLIAMS, Esq.

49. For the best and most useful collection of Agricultural Implements, *bonâ fide* the property of the Exhibitor, 10*l.*; to Mr. HUGH BIRD, Cardiff, Glamorgan; and a Second Prize of 1*l.* to Messrs. A. and T. Fry, Bristol, Somerset.

OFFERED BY A MEMBER OF THE SOCIETY.

50. For the best Machine for sowing grain of all kinds broad-cast, capable of being worked by one horse, 1*l.*; to Messrs. HOLMES and SON, Norwich, Norfolk.

OFFERED BY JONATHAN GRAY, C. C. WILLIAMS, AND
T. D. ACLAND, Esqrs.

51. For the best Specimen of 10 yards of real South Wales White Flannel, three yards wide, 3*l.*; to Mr. DAVID LEWIS, Pandy Machen, Monmouthshire.—Second Prize, 1*l.*; to Mr. W. SMITH, Tonyrevail, Pontypridd. The Prize to be decided by texture and durability.
52. For the best Specimen of 10 yards of Blue and White, or Red and White Striped Flannel for Gowns, woven in the National Style of South Wales, 3*l.*; to Mr. DAVID LEWIS, Pandy Machen, Monmouthshire. The Prize to be decided by its quality, pattern, and colours.—Second Prize, 1*l.*; to Mr. WM. SMITH, Tonyrevail, Pontypridd.
53. For the best Specimen of 12 yards of Welsh Fancy Plaid Flannel, adapted for Ladies' Dresses, 5*l.*; to Mr. DAVID LEWIS, Pandy Machen, Monmouthshire.—Second Prize, 1*l.*; to Mr. WM. SMITH, Tonyrevail, Pontypridd.

AWARDS OF CERTIFICATE OF MERIT.

For Single or Double Drag ; to Mr. THOMAS LYNE, Malmesbury, Wilts.
For a Spiked Chain Harrow ; to Mr. THOMAS LEMON, Cardiff, Glamorgan.

SPECIAL AWARDS.

For a Paring Plough, 2*l.* ; to Mr. WILLIAM WOOFÉ, Regent-street, Gloucester.
For Lever Harrows, 1*l.* ; to Mr. THOMAS LYNE, Malmesbury, Wilts.
For Chandler's Water Drill, with Reeves's improvements, and Chambers's drop, 5*l.* ; to Messrs. R. and J. REEVES, Westbury, Wilts.
For improvements in his Corn Screen, by which the wires can be set fine or coarse, 1*l.* ; to Mr. ROBT. BOBY, Bury St. Edmund's, Suffolk.
For an improved Horse Hoe, 1*l.* ; to Messrs. GARRETT and SON, Saxmundham, Suffolk.
For improved Steam-power Portable Clover Seed Drawing Machine, 2*l.* ; awarded to Messrs. HOLMES and SONS, of Norwich, in the county of Norfolk.

HIGHLY COMMENDED.

A Winnowing Machine ; Mr. ROBERT BOBY, Bury St. Edmund's, Suffolk.
A Cultivator, Grubber, and Scarifier (wide) ; Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
A set of Seed Harrows ; Mr. JAMES COMINS, South Molton, Devon.
Plough for general purposes ; THOMAS LEMON, Cardiff, Glamorgan.
Chaff-cutting Machine ; Mr. JAMES CORNES, of Nantwich, Cheshire.

COMMENDED.

A Subsoil Plough ; Mr. JOHN EDDY, Kennford, Devon.
A Turnwrest Plough ; Messrs. J. and R. WRIGHT, Sandford, Devon.
A Cultivator, Grubber, and Scarifier (wide) ; Mr. HUGH CARSON, Warminster, Wilts.
A set of Seed Harrows ; Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
A set of Harrows ; THOMAS LYNE, Malmesbury, Wilts.
A Clod Crusher or Pulverizer ; Messrs. A. and T. FRY, Temple Gate, Bristol.
A Cultivator, Grubber, and Scarifier (narrow) ; Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
A Single or Double Drag ; Mr. JOHN EDDY, Kennford, Devon.
A Single or Double Drag ; Messrs. J. and R. WRIGHT, Sandford, Devon.
A set of Harrows ; Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
Plough for general purposes ; Mr. HUGH CARSON, Warminster, Wilts.
Plough for general purposes ; JOHN EDDY, Kennford, Devon.
Plough for general purposes ; Mr. REUBEN LEWIS, Whitchurch, near Cardiff, Glamorgan.
Clod Crusher, or Pulveriser ; HUGH CARSON, Warminster, Wilts.
Clod Crusher, or Pulveriser ; Mr. JOHN EDDY, Kennford, Devon.
Oilcake Crusher ; Messrs. SMITH and ASHBY, Stamford, Lincoln.
Chaff-cutting Machine ; Messrs. RICHMOND and CHANDLER, of Salford, Manchester.
Patent Safety Chaff Cutter ; Messrs. SMITH and ASHBY, of Stamford, Lincoln.
Double Ridge Horse-hoe ; Mr. E. H. BENTALL, Heybridge, near Maldon, Essex.
A winnowing Machine ; Mr. GEORGE WREFOED, Newport, Barnstaple, Devon.

Award of Prizes FOR POULTRY.

JUDGES.—E. HEWETT, Esq., and T. G. TEGEHUIER, Esq.

SPANISH.—Silver cup, MR. C. R. TITTERTON, Birmingham; 2nd Prize, MR. JOHN KERSLEY FOWLER, Aylesbury.

DORKING (Coloured).—Silver cup, MR. WILLIAM BROMLEY, Birmingham; 2nd Prize, MRS. PETTAT, Basingstoke; highly commended, MR. RICHARD FORMAN, Merthyr Tydvil, MR. D. WILLIAMS, Merthyr Tydvil, and MR. C. R. TITTERTON, Birmingham; commended, MR. ROBERT CRAWSHAY, Cyfarthfa Castle, Glamorganshire; MR. GEORGE CHADWIN, Tollard Royal, near Salisbury; and MISS ANN WILCOX, Nailsea-court, Bristol. *White:* Silver cup, MR. F. J. COLERIDGE, Manor House, Ottery St. Mary, Devon; 2nd Prize, Rev. G. F. HODSON, North Petherton, Bridgwater.

COCHIN CHINA (Cinnamon Buff, or Lemon).—Silver Cup, MRS. HENRY FOOKES, Whitechurch, Blandford, Dorset; 2nd Prize, MRS. HENRY FOOKES, Whitechurch; highly commended, MR. JOHN KERSLEY FOWLER, Aylesbury, and MR. JAMES CATTELL, Birmingham. *Brown Partridge and Grouse:* Silver Cup, MR. G. C. ADKINS, Birmingham; 2nd Prize, MR. JAMES CATTELL, Birmingham; highly commended, Rev. G. F. HODSON, North Petherton, Somerset. *White and Black:* Silver Cup, MR. ROBERT CRAWSHAY, Cyfarthfa Castle, Glamorganshire; 2nd Prize, MR. C. R. TITTERTON, Birmingham.

BRAMAH POUTRA.—Silver Cup, MR. RICHARD TEEBAY, Fulwood, near Preston; 2nd Prize, MR. RICHARD TEEBAY; commended, MR. J. K. BARTUM, Bath; ditto, ditto.

GAME (White and Piles).—Silver Cup, REV. G. S. CRUWYS, Cruwys Morchard Court, Tiverton, Devon; 2nd Prize, MR. SAMUEL MATHEW, Stowmarket, Suffolk. *Black-breasted and other Reds:* Silver Cup, DR. R. R. SEWELL, Bridgwater, Somerset; 2nd Prize, MR. W. BUNCOMBE, Barnstaple; highly commended, MR. HENRY LEWIS, Green Meadow, near Cardiff; commended, REV. G. S. CRUWYS, Cruwys Morchard Court. *Duckwings, and other Greys and Blues:* Silver Cup, MR. SAMUEL MATHEW, Stowmarket; 2nd Prize, MR. WILLIAM DAWSON, Birmingham. *Blacks and Brassy-winged, except Greys:* Silver Cup, MR. J. R. ROXBARD, Langford, near Bristol; 2nd Prize, MR. WM. DAWSON, Birmingham.

MALAY.—Silver Cup, MR. R. W. FRYER, Hinton-road, near Hereford; 2nd Prize, MR. WILLIAM ROGERS, Woodbridge, Suffolk; highly commended, MR. S. SAUNDERS, 12, Portman-terrace, Middlesex; commended, MR. JOHN BUNCOMBE, Wellington, MR. JAMES LEIGHTON, Cheltenham, and MR. WILLIAM ROGERS, Woodbridge, Suffolk.

HAMBURGH (Golden Pencilled).—Silver Cup, MR. JOSIAH B. CHUNE, Coalbrookdale, Shropshire; 2nd Prize, DR. J. M. SUTTON, Tenby, Pembrokeshire; highly commended, MR. C. R. TITTERTON, Birmingham. *Single Pencilled:* Silver Cup, MR. T. KEABLE, Devizes, Wilts; 2nd Prize, MR. GEORGE GRIFFITHS, Worcester; commended, MR. T. KEABLE, Devizes. *Golden Spangled:* Silver Cup, MR. J. B. CHUNE, Coalbrookdale; 2nd Prize, MR. J. B.

CHUNE; commended, MR. C. E. COLERIDGE, Eton College, Windsor, and MRS. HENRY FOKES, Whitechurch, Blandford. *Silver Spangled*: Silver Cup, MR. RICHARD TEEBAY, Fulwood, near Preston; 2nd Prize, MR. J. B. CHUNE, Coalbrookdale.

POLANDS (*Black with White Crests*).—Silver Cup, MR. GEORGE RAY, Lyndhurst, Hants; 2nd Prize, MR. T. P. EDWARDS, Lyndhurst, Hants. *Golden Spangled*: Silver Cup, MR. R. H. BUSH, Litfield House, Clifton; 2nd Prize, MR. G. S. FOX, The Court, Wellington, Somerset; commended, MRS. PETTAT, Basingstoke. *Silver Spangled*: Silver Cup, MR. DAWSON, Birmingham; 2nd Prize, MR. G. C. ADKINS, Birmingham; highly commended, MR. C. R. TITTERTON, Birmingham.

ANY DISTINCT BREED.—Silver Cup, Miss S. H. NORTHCOTE, Upton Pyne, near Exeter, *White Spanish*; 2nd Prize, MR. R. W. FRYER, Hinton-road, near Hereford, *Black Hamburg*; highly commended, MR. HENRY CHURCHILL, Gloucester, *Buff Polands*, and MR. CHARLES COLES, Fareham, Hants, *Andalusian*; commended, MR. C. H. OLIVER, Newport, Monmouthshire, *Black Hamburg*, and MR. R. CRAWSHAY, Cyfarthfa Castle, Glamorganshire, *Black Hamburg*, and *Indian Game*.

CHICKENS.—Cups, MR. JOHN KERSLEY FOWLER, Prebandale Farm, Aylesbury; MR. J. R. ROBBARD, Aldwick-court, Langford, near Bristol; Mr. J. R. ROBBARD, Aldwick-court, Langford, near Bristol. Medal, MR. GEORGE CHADWIN, Tollard Royal, near Salisbury, Wilts; MR. PARKINS H. JONES, High-street, Fulham, Middlesex; MR. PARKINS H. JONES, High-street, Fulham, Middlesex. 1l. for the *best table Fowls*, MR. W. BROMLEY, Smithfield, Birmingham; highly commended, MR. G. W. LOCKE, Newport, Isle of Wight; commended, Miss CRISTINA STEWART, the Limes, Croydon, Surrey; MR. CHARLES COLES, Fareham, Hants.

SPANISH, *single Cock*.—Silver Cup, MR. J. K. FOWLER, Aylesbury; 2nd Prize, MR. J. K. BARTRUM, Bath.

DORKING *single Cock*.—Silver Cup, MR. HENRY CHILD, JUN., Birmingham; 2nd Prize, MR. C. H. WAKEFIELD, Malvern Wells; highly commended, MR. HENRY LINGWOOD, Needham-Market, Suffolk.

GAME, *single Cock*.—Silver Cup, MR. E. G. JARVIS, Ilton, near Chepstow; 2nd Prize, MR. G. HOWARD, Malmesbury, Wiltshire; commended, MR. ERNEST BOWLEY, Cirencester.

BANTAMS (*Gold Laced*).—Silver Cup, REV. G. S. CRUYS, Cruwys Morchard Court; 2nd Prize, MR. G. C. ADKINS, Edgbaston; highly commended, MR. R. CRAWSHAW, Cyfarthfa Castle, REV. G. F. HODSON, North Petherton; commended, MR. C. R. TITTERTON, Birmingham. *Silver Laced*: Silver Cup, REV. G. S. CRUYS, Cruwys Morchard Court; 2nd Prize, MRS. PETTAT, Basingstoke; highly commended, REV. G. S. CRUYS, Cruwys Morchard Court; ditto, ditto. *White*: Silver Cup, MR. C. R. TITTERTON, Birmingham; 2nd Prize, REV. G. S. CRUYS, Cruwys Morchard; highly commended, MR. J. K. BARTRUM, Bath. *Black*: Silver Cup, MR. C. R. TITTERTON, Birmingham; 2nd Prize, MR. GEORGE WARREN, Merthyr Tydvil. *Any other variety*: Silver Cup, MR. HENRY CHURCHILL, Gloucester; 2nd Prize, MR. T. B. BROWNE, Salperton Park, Gloucestershire.

DUCKS (*Aylesbury*).—Silver Cup, MR. J. K. FOWLER, Aylesbury; Second Prize, MR. J. K. FOWLER; highly commended, MRS. HENRY FOKES, Whitechurch, Blandford; commended, MR. E. PAYNE, Wharf, Cardiff. *Rouen*: Silver Cup, MR. J. K. FOWLER, Aylesbury; Second Prize, MR. J. R. ROBBARD, Aldwick Court. *Any other variety*: Silver Cup, MR. J. K. FOWLER, Aylesbury,

East India; Second Prize, MR. HENRY CHURCHILL, Gloucester, *East India*; commended, MR. O. BALANCE, Taunton, *East India*.

GEESSE.—Silver Cup, MR. J. K. FOWLER, Aylesbury, *Toulouse*; Second Prize, MRS. LLEWELLYN, Court-Colman, Bridgend, *Emden*; highly commended, MR. E. PAYNE, *Cape or Chinese Geese, black bills*.

TURKEYS.—Silver Cup, MISS JULIA MILWARD, Newton St. Loe, Bath; Second Prize, MR. E. COLSTON, Abergavenny.

PEA FOWLS.—Silver Cup, MR. J. BUCKLEY, Llanelly; Second Prize, MISS LOUISE CRAWSHAY, Reading, *half Java*.

PIGEONS (*Carriers*).—Prize, MR. G. C. ADKINS, Edgbaston; highly commended, MR. S. SUMMERHAYES, Taunton; commended, MR. F. G. STEEVENS, Hemyock, Wellington. *Barbs*: Prize, MR. F. G. STEEVENS, Hemyock; highly commended, ditto, ditto, and MR. G. C. ADKINS, Birmingham; commended, MR. F. G. STEEVENS, Hemyock. *Pouters*: Prize, MR. G. C. ADKINS, Edgbaston; very highly commended, MR. F. G. STEEVENS, Hemyock. *Runts*: Prize, MR. F. G. STEEVENS, Hemyock. *Runts*: Prize, MR. F. G. STEEVENS, Hemyock. *Fantails*: Prize, MR. F. G. STEEVENS, Hemyock; highly commended, MR. G. C. ADKINS, Birmingham. *Jacobins*: Prize, MR. G. C. ADKINS, Birmingham. *Turbits*: Prize, MR. G. C. ADKINS, Birmingham. *Nuns*: Prize, MR. G. C. ADKINS, Birmingham. *Archangels*: Prize, MR. F. G. STEEVENS, Hemyock. *Trumpeters*: Prize, MR. G. C. ADKINS, Edgbaston; highly commended, MR. F. G. STEEVENS, Hemyock; commended, ditto, ditto. *Almond Tumblers*: Prize, MR. G. C. ADKINS, Birmingham; highly commended, MR. F. G. STEEVENS. *Tumblers (any other variety)*: Prize, MR. F. G. STEEVENS, Hemyock, *black mottled*; highly commended, MR. G. C. ADKINS, Edgbaston, *bald and beards*. *Owls*: Prize, MR. G. C. ADKINS, Edgbaston; highly commended, ditto, ditto, and MR. F. G. STEEVENS, Hemyock. *Dragons*: Prize, MR. G. C. ADKINS, Edgbaston; highly commended, MR. W. B. HELLARD, Taunton. *Any other sort of Pigeons*: Prize, MR. W. B. HELLARD, Taunton, *mieves*; highly commended, MR. G. C. ADKINS, Edgbaston, *maggies*, and MR. F. G. STEEVENS, Hemyock, *swallows*; commended, MR. F. G. STEEVENS, Hemyock, *black Brunswick*.

Award of Prizes
FOR ESSAYS,
FOR 1858.

I. ON FARM BUILDINGS FOR SMALL FARMS £20
Awarded conditionally to the Essay bearing the motto, "Chacun à son gout."

II. REPORT OF PERSONAL EXPERIENCE ON A FARM IN THE WEST OF
ENGLAND £20
Awarded to Joseph Lush, Brewham House, Bruton. Motto, "Pedestrian."

III. ON IRRIGATION £10
Awarded to Henry Tanner, The Lodge, Puddington, Crediton.

IV. ON SHEEP SUITED TO THE WEST OF ENGLAND £15
Awarded to Henry Tanner, The Lodge, Puddington, Crediton. Motto, "Je vis en espoir."

V. ON CARTS AND WAGGONS £10
Awarded to E. Spender, Mannamead, Plymouth, and T. W. P. Isaac, Northgate Street, Bath, as joint Authors. Motto, "Festina lente."

VI. ON ORCHARDS £10
Awarded to William Heale, Upton Nurseries, Chester. Motto, "Every tree is known by its fruit."

VII. ANY OTHER AGRICULTURAL SUBJECT £10

VIII. ANY CHEMICAL SUBJECT SUITED TO ASSIST THE AGRICULTURIST £10

IX. SPECIAL PRIZES OFFERED BY SIR WALTER C. TREVELYAN, BART.

ON CIDER—To be considered in its economical, physical, moral, and social effects; more especially with reference to its use in the rural districts of Somersetshire and the other parts of England.

FOR THE BEST AND APPROVED ESSAY £25

FOR THE SECOND-BEST AND APPROVED ESSAY £10

Awarded to Edward Spender, of Mannainead, Plymouth, and T. W. P. Isaac of Northgate Street, Bath, as joint Authors. Motto, "Fais ce que doi, advienne que pourra."

Two Essays—one on Orchards, with the Motto, "Semper Fidelis;" the other on the same subject, with the distinguishing mark of the Three Trees—were highly commended by the Committee.

Prizes offered
AT THE MEETING OF 1859
 TO BE HELD AT
BARNSTAPLE, NORTH DEVON,
 ON THE 1ST, 2ND, AND 3RD DAYS OF JUNE.

Prizes for Cattle, Sheep, Horses, and Pigs.

CATTLE.

DEVONS.

	<i>Prizes.</i>
CLASS 1.—For the best Bull, above three years old on the 1st June, 1859	£8
CLASS 2.—For the best Bull, not exceeding three years old on 1st June, 1859	12
Second ditto	5
CLASS 3.—For the best Bull, not exceeding two years old on 1st June, 1859	10
Second ditto	5
Third ditto	3
For the best Bull shown in either of the Classes 2 and 3 (given by John Sillifant, Esq., the President of the Society)	£10. 10s.
CLASS 4.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the exhibition)	£8
Second ditto	4
CLASS 5.—For the best Heifer, in Calf or in Milk, not exceeding three years old on 1st June, 1859	8
Second ditto	4
CLASS 6.—For the best Pair of Heifers, not exceeding two years old on 1st June, 1859, belonging to the same owner	8
Second ditto	4

SHORT-HORNS.

CLASS 7.—For the best Bull, above three years old on 1st June, 1859	£8
CLASS 8.—For the best Bull, not exceeding three years old on 1st June, 1859	12
Second ditto	5
CLASS 9.—For the best Bull, not exceeding two years old on 1st June, 1859	10
Second ditto	5
CLASS 10.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the exhibition)	£8
Second ditto	4
CLASS 11.—For the best Heifer, in Calf or in Milk, not exceeding three years old on 1st June, 1859	8
Second ditto	4
CLASS 12.—For the best Pair of Heifers, not exceeding two years old on 1st June, 1859, belonging to the same owner	8
Second ditto	4

HEREFORDS.

	Prizes
CLASS 13.—For the best Bull, above three years old on the 1st of June, 1859	£8
CLASS 14.—For the best Bull, not exceeding three years old on the 1st June, 1859	12
Second ditto	5
CLASS 15.—For the best Bull, not exceeding two years old on the 1st June, 1859	10
Second ditto	5
CLASS 16.—For the best Cow in Calf (or in Milk, having had a Calf within six months next preceding the first day of the exhibition)	8
Second ditto	4
CLASS 17.—For the best Heifer, in Calf or in Milk, not exceeding 3 years old on the 1st June, 1859	8
Second ditto	4
CLASS 18.—For the best Pair of Heifers, not exceeding two years old on the 1st June, 1859, belonging to the same owner	8
Second ditto	4

S H E E P.

LEICESTER, OR LONG-WOOLLED.

(Not qualified to compete as Cotswold.)

CLASS 19.—For the best Yearling Ram	£6
Second ditto	4
Third ditto	2
CLASS 20.—For the best Ram of any other age	5
Second ditto	3
CLASS 21.—For the best pen of five two-teeth Ewes	5
Second ditto	3
Third ditto	2

COTSWOLD.

CLASS 22.—For the best Yearling Ram	£5
Second ditto	3
CLASS 23.—For the best Ram of any other age	4
Second ditto	2
CLASS 24.—For the best pen of five two-teeth Ewes	5
Second ditto	3

SOUTHDOWNS.

CLASS 25.—For the best Yearling Ram	£5
Second ditto	3
CLASS 26.—For the best Ram of any other age	4
Second ditto	2
CLASS 27.—For the best pen of five two-teeth Ewes	5
Second ditto	3

SHROPSHIRE DOWN OR HAMPSHIRE DOWN.

(Not qualified to compete as South Downs.)

CLASS 28.—For the best Yearling Ram	£5
Second ditto	3
CLASS 29.—For the best Ram of any other age	4
Second ditto	2
CLASS 30.—For the best pen of five two-teeth Ewes	5
Second ditto	3

SOMERSET AND DORSET HORNS.		Prizes.
CLASS 31.—For the best Yearling Ram		£5
Second ditto		3
CLASS 32.—For the best Ram of any other age		3
Second ditto		2
CLASS 33.—For the best pen of five two-teeth Ewes		5
Second ditto		3
MOUNTAIN SHEEP.		
CLASS 34.—For the best Ram of any age		£4
Second ditto		2
CLASS 35.—For the best pen of five Two-teeth Ewes		4
Second ditto		2
CLASS 36.—For the best pen of five Ewes of any age		4
Second ditto		2

HORSES.

FOR AGRICULTURAL PURPOSES.		
CLASS 37.—For the best Mare and foal, or in Foal		£8
Second ditto		5
CLASS 38.—For the best two years old Colt		10
Second ditto		5
CLASS 39.—For the best two years old Filly		5
Second ditto		3
CLASS 40.—For the best yearling Colt or Filly		5
Second ditto		3
HORSES FOR HACKS, OR HUNTERS.		
CLASS 41.—For the best Mare and foal, or in Foal		£8
Second ditto		5
CLASS 42.—For the best two years old Filly		5
Second ditto		3
CLASS 43.—For the best yearling Colt or Filly		5
Second ditto		3
CLASS 44.—For the best two or three years old Colt or Gelding		5
Second ditto		3

PONIES.

CLASS 45.—For the best Mare Pony of any breed, not exceeding 14 hands high		£4
Second ditto		2
CLASS 46.—For the best Mare Pony of any breed, not exceeding 13 hands high		4
Second ditto		2
CLASS 47.—For the best Stallion Pony of any breed, not exceeding 14 hands high		5
Second ditto		3

PIGS.

LARGE BREED.		
CLASS 48.—For the best Boar, not exceeding two years old on 1st January, 1859		£4
Second ditto		2
CLASS 49.—For the best Breeding Sow in farrow, or that has farrowed within four months of the first day of the exhibition		4
Second ditto		2
CLASS 50.—For the best pen of three Breeding Sows, not exceeding nine months of age on 1st June, 1859		3
Second ditto		2

Prizes for Cattle, &c., for 1859.

SMALL BREED.		Prize.
CLASS 51.—For the best Boar, not exceeding two years old on 1st January, 1859		£4
Second ditto		2
CLASS 52.—For the best Breeding Sow in farrow, or that has farrowed within four months of the first day of the exhibition		4
Second ditto		2
CLASS 53.—For the best pen of three Breeding Sows, not exceeding nine months of age on the 1st June, 1859		3
Second ditto		2

SPECIAL PRIZES.

GIVEN BY WILLIAM MILES, Esq.

CLASS 54.—For the best Shoeing-smith, the shoes to be made and fixed on the ground	£3	3s.
Second best	2	2
Third best	1	1

Persons intending to compete for the Shoeing Prizes must give notice in writing to the Secretary, 2, Wood Street, Bath, on or before the 1st day of May, 1859, and must be at the Director's Office in the Show Yard on Wednesday morning, the 1st day of June, 1859, at 8 o'clock, to receive instructions.

* * Judges have power to expend a sum not exceeding 20*l.* in prizes for Extra Stock.

SPECIAL CONDITIONS.

When the Cows and Heifers are certified to be in Calf, and not having Calved within Six Months previous to the first day of Exhibition, the Prizes awarded will not be paid until a Certificate of Calving has been delivered to the Secretary.

The Bulls in Classes 1, 2, 7, 8, 13, and 14 shall be certified to be the Sires of live Calves.

The Sheep must be shorn *close* in every part not earlier than the 1st of May. The Judges will be instructed to disqualify *all unfairly shorn*.

No animal of any kind which has gained a First Prize in any Class, at a Meeting of this Society, will be allowed to compete in the same Class at any future Meeting. No animal can be entered in more than one Class.

Each lot of Ewes must be of the same Flock.

The three Sow Pigs in each pen must be of the same litter.

All Foals must be the offspring of the Mare along with which they are exhibited for a prize.

In all cases where prizes are awarded *conditionally*, they will be withheld until the exhibitor shall have proved to the satisfaction of the Council that the conditions have been complied with.

All animals exhibited must be *bonâ fide* the property of the exhibitor.

RÛLES OF ADJUDICATION.

In awarding the Prizes to Cattle, Sheep, and Pigs, the Judges will be especially instructed not to take into consideration the present value to the Butcher of the animals exhibited; but to decide according to their relative merits for the purpose of Breeding.

The Judges will be instructed not to award any prize in classes in which the animals exhibited do not possess *sufficient merit*.

General Regulations for the Exhibition of Live Stock. 1859.

1. PERSONS intending to exhibit Stock must send in their applications for blank forms of Certificates to the Secretary, No. 2, Wood Street, Bath, on or before the 5th of April, 1859—(forms of application can be obtained of the Secretary); on receiving such application the Secretary will forward to each Exhibitor copies of the required form of certificate, which must be filled up and *returned* to him on or *before the 19th of April, 1859*. All Forms of Certificate insufficiently or incorrectly filled up will be at once returned to the proposing Exhibitor by the Secretary: and if these are not thoroughly completed in all particulars, and sent to the Secretary before the 1st day of May, 1859, the animal to which the certificate refers will be excluded from competition. No Member whose subscription is in arrear will be allowed to exhibit until his Subscription is paid. Non-Members must pay 10s. for every head or lot of Live Stock, before obtaining a ticket of admission to bring them into the Show-yard. Any person entering more lots in any one Class than the number of Prizes offered, must pay for the additional number 5s. for each lot of Sheep, Bullocks, and Pigs, 15s. for each Horse and Colt, and 10s. for each Pony.

2. All persons may exhibit an unlimited number of Animals as Extra Stock, by payment of 5s. per lot for Bullocks, Sheep, and Pigs, and 10s. for Horses and Colts, and 10s. for Ponies.

N.B.—*One or more animals, according to the classes, as set out in prize-sheet, shall be deemed a lot.*

3. Any person entering any Stock, and failing to exhibit the same, shall pay a penalty, in the case of Cattle or Horses, of 10s., and of Sheep or Pigs of 5s., per lot, or be disqualified from exhibiting in future, *unless the non-exhibition of such Stock be caused by the death of the animal or animals, contagious disease, or unavoidable injury.*

4. All Animals intended for exhibition must be brought to the Show-yard on Monday the 30th day of May, between the hours of 10 in the morning and 7 in the evening, and between 7 in the morning and 2 in the afternoon of Tuesday the 31st day of May, OTHERWISE THEY WILL NOT BE ADMITTED. The *cloth ticket*, which will be sent by the Secretary, *must be properly tied on each animal before it is brought to the gate*; and the admission order, which will be also sent by the Secretary, for stock properly entered, *must be delivered to the gatekeeper of the yard by the person who brings the stock for admission.*

5. *All Bulls must have a ring or clamp attached to their nose, and all other cattle be properly secured to the satisfaction of the Director and Stewards, on being brought to the gate of the yard, or THEY WILL NOT BE ADMITTED.*

6. All Servants in charge of Stock, and all Stock brought into the Show-yard, will be subject to the Orders, Regulations, and Rules of the Director and Stewards of the Cattle-yard. *Bona-fide Servants only in charge will be allowed to enter the Show-yard with their Stock.*

7. All Stock must remain in the Show-yard until after Two o'clock in the afternoon of Friday the 8th day of June, and as much longer as the Director may deem necessary. The delivery order, filled up and signed by the Exhibitor or his agent, must be delivered up to the gatekeeper:—*no Stock can be removed without it.*

NOTE.—Hay, straw, and green food will be provided for the stock whilst in the yard free of expense.

By order of the Council,

HENRY ST. JOHN MAULE, Secretary,

Aug. 28th, 1858.

2, Wood Street, Bath.

Prizes offered

AT THE MEETING OF 1859,

TO BE HELD AT

THE TOWN OF BARNSTAPLE,

ON THE 1ST, 2ND, AND 3RD DAYS OF JUNE.

Prizes for Poultry and Pigeons.**POULTRY.****SPANISH.**

Class							£.	s.	d.
1.—	For the best Cock and two Hens.	A Chased Silver Cup, value	4	0	0				
	Second Prize	.	.	.	.	.	1	0	0
	Third Prize	.	.	.	.	.	0	10	0

DORKING (COLOURED OR WHITE).

2.—	For the best Cock and two Hens	.	.	A Chased Silver Cup.					
	Second Prize	.	.	.	.	.	1	0	0
	Third Prize	.	.	.	.	.	0	10	0

COCHIN-CHINA (CINNAMON, BUFF, OR LEMON).

3.—	For the best Cock and two Hens	.	.	A Chased Silver Cup.					
	Second Prize	.	.	.	.	.	1	0	0
	Third Prize	.	.	.	.	.	0	10	0

COCHIN-CHINA (BROWN, PARTRIDGE, AND GROUSE, WHITE OR BLACK).

4.—	For the best Cock and two Hens	.	.	A Chased Silver Cup.					
	Second Prize	.	.	.	.	.	1	0	0
	Third Prize	.	.	.	.	.	0	10	0

GAME (WHITE AND PILES, BLACKS AND BRASSY-WINGED).

5.—	For the best Cock and two Hens	.	.	A Chased Silver Cup.					
	Second Prize	.	.	.	.	.	1	0	0
	Third Prize	.	.	.	.	.	0	10	0

GAME (BLACK-BREADED AND OTHER REDS).

6.—	For the best Cock and two Hens	.	.	A Chased Silver Cup.					
	Second Prize	.	.	.	.	.	1	0	0
	Third Prize	.	.	.	.	.	0	10	0

GAME (DUCKWINGS AND OTHER GREYS AND BLUES).

7.—	For the best Cock and two Hens	.	.	A Chased Silver Cup.					
	Second Prize	.	.	.	.	.	1	0	0
	Third Prize	.	.	.	.	.	0	10	0

Prizes for Poultry, &c., for 1859.

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Class £. s. d.

MALAY.

8.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

HAMBURGH (GOLDEN AND SILVER PENCILLED).

9.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

HAMBURGH (GOLDEN AND SILVER SPANGLED).

10.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

POLANDS (BLACK, WITH WHITE CRESTS).

11.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

POLANDS (GOLDEN AND SILVER SPANGLED).

12.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

ANY VARIETY

NOT COMPRISED IN THE FOREMENTIONED CLASSES.

13.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

SPANISH CHICKENS.

One Male and Two Females to be Exhibited in each Class of Chickens.

*14.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

DORKING CHICKENS (OF ANY VARIETY).

*15.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

GAME CHICKENS (OF ANY VARIETY).

*16.—For the best Cock and two Hens	.	.	A Chased Silver Cup.						
Second Prize	.	.	.	.	.	.	1	0	0
Third Prize	.	.	.	.	.	.	0	10	0

* A Prize of 1l. will be given to the best Pen of Chickens shown in these classes, considered entirely with regard to table purposes. Cross-bred birds competing for this prize must have their origin stated. Absence of offal, whiteness of skin and fat, early maturity and size, will be chiefly considered.

Class £. s. d.

COCHIN-CHINA CHICKENS (ANY VARIETY).

*17.—For the best Cock and two Hens	A Chased Silver Cup.
Second Prize	1 0 0
Third Prize	0 10 0

A Chased Silver Cup will be given to the best Pen of Bantams.

BANTAMS (GOLD-LACED).

18.—For the best Cock and two Hens	1 10 0
Second Prize	0 10 0
Third Prize	0 5 0

BANTAMS (SILVER-LACED).

19.—For the best Cock and two Hens	1 10 0
Second Prize	0 10 0

BANTAMS (WHITE AND BLACK).

20.—For the best Cock and two Hens	1 10 0
Second Prize	0 10 0
Third Prize	0 5 0

BANTAMS (OF ANY OTHER VARIETY).

21.—For the best Cock and two Hens	1 10 0
Second Prize	0 10 0
Third Prize	0 5 0

DUCKS (WHITE AYLESBURY).

22.—For the best Drake and two Ducks	1 10 0
Second Prize	0 10 0
Third Prize	0 5 0

DUCKS (ROUEN).

23.—For the best Drake and two Ducks	1 10 0
Second Prize	0 10 0
Third Prize	0 5 0

DUCKS (ANY OTHER VARIETY).

24.—For the best Drake and two Ducks	1 10 0
Second Prize	0 10 0
Third Prize	0 5 0

GEESE.

25.—For the best Gander and Goose	1 10 0
Second Prize	0 15 0

TURKEYS.

26.—For the best Cock and Hen	1 10 0
Second Prize	0 15 0

PEAFOWLS.

27.—For the best Pen of Peafowls	1 10 0
Second Prize	0 10 0

Class	GUINEA FOWLS.					£.	s.	d.
28.—For the best Pair	.	.	.	.	.	1	0	0
Second Prize	.	.	.	.	.	0	10	0

PIGEONS.

A handsome Chased Silver Cup will be given to the Exhibitor who obtains the greatest number of Prizes, and the Society's Medal to the second on the Prize List.

Carriers (Dun or Blacks).

Class	£.	s.	d.
28a.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Carriers (Blue, White, or other Colour).

29.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Tumblers (Almond).

30.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Tumblers (any other variety).

31.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Pouters.

32.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Runts.

33.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Jacobins.

34.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Fantails.

35.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Owls.

Class	£.	s.	d.
36.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Trumpeters.

37.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Barbes.

38.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Turbits.

39.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Nuns.

40.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Dragoons.

41.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Blue Rocks.

42.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Jacobins.

43.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

Any other New or Distinct Variety.

44.—For the best Cock and Hen . . .	0	15	0
Second Prize . . .	0	7	6

CONDITIONS AND REGULATIONS.

ALL Exhibitors will be required to pay for coops, food, attendance, &c., as follows:—

To Class 17 inclusive	. . .	6s. 0d. per pen.
Turkeys, Geese, and Peafowls, &c.	. . .	5s. 0d. „
Bantams and Ducks	. . .	4s. 0d. „
Pigeons	. . .	3s. 0d. „

The above fees include the free delivery of all birds to and from the Show-yard to the railway station, *but all carriage must be pre-paid to the Barnstaple station. As it sometimes happens that carriage cannot be paid through, the Secretary must be advised of the fact, otherwise the birds will not be received.*

All Certificates of entry must be forwarded to Mr. John Kingsbury, Honorary Secretary, 10, Hammet Street, Taunton, together with the amount of fees chargeable at the above rates, on or before the 1st of May, 1859, on printed blank forms, which will be furnished by him on application.

Exhibitors must state the price, breed, and age (if possible), calculated up to the day of exhibition, of their specimens, on their certificates; and all birds competing for any chicken's prize must have their *exact ages* entered thereon. And a sale *must take place* if the price be offered through the Secretary.

High condition, quality, beauty of plumage, purity of race, and uniformity in the markings, combs, and other characteristics, will, in all the classes for Fowl, be taken into consideration by the Judges in a greater degree than mere weight without these distinctions, if the more perfect specimens are at the same time of a fair average size.

All specimens must be *bonâ fide* the property of the Exhibitor; the discovery of any wilful misstatement will exclude the Exhibitor from all future Exhibitions.

The Judges will be empowered to withhold any prize where specimens are not considered of sufficient merit, or have been clipped, drawn, or trimmed.

The Poultry department will be subject to the rules and regulations of the Steward.

The Society's Bronze Medals will be given, if desired, in lieu of Second Money Prizes.

The Great Western Railway Company, Bristol and Exeter Railway Company, North and South Devon Railway Company, and Midland Counties Railway Company, have consented to take birds to and from the Exhibition at half the usual rates of charge. No charge will be made for conveyance from the Railway to the place of exhibition.

All the specimens intended for exhibition must be at the Show-yard before 10 o'clock on the morning of Tuesday the 31st of May, *otherwise they will not be admitted*; and no specimen can be removed before 4 o'clock P.M. on Friday the 3rd of June.

All Eggs laid will be destroyed.

It is particularly desired that no birds be sent unless in a perfectly healthy condition.

All birds to which prices have been affixed may be claimed at the price

put upon them after 3 o'clock on the first day. Application to be made at the Secretary's office, where all sales must be effected, and payment made when the birds are claimed.

Exhibitors are particularly requested carefully to examine the Prize Lists and Regulations of the Show, in order to avoid errors in making their entries. It must also be understood that *no alteration can be made in the prices as stated on the certificates*, and set forth in the Catalogue; that the specimens must be *sold in pens, and not divided*; and that the persons who have the management of the sales cannot take charge of fowl which are disposed of privately. Attention to these regulations will greatly facilitate the business of the Show, and prevent errors in the accounts, and in the despatch of the specimens at the close.

The Steward pledges himself to take every care of the Poultry forwarded for competition, but will not in any case be responsible for any unforeseen accident, loss, or mistake that may possibly occur.

In case of the death of any Poultry during the time of exhibition, the bird or birds so lost will be sent back for the inspection of the Exhibitor.

A charge of 10 per cent. will be made for all birds sold.

All parties *applying* to the Secretary for Certificates to enclose a postage stamp.

All birds purchased must pay full railway fare from the show.

Catalogues will be sent when the party applying encloses 8 postage stamps.

. *The Steward will feel particularly obliged by intending Exhibitors applying, at as early a period as they can with convenience do so, for their Certificates, and returning the same.*

Steward of the Department.

SAMUEL PITMAN, Rumwell Lodge, Taunton.

Secretary.

JOHN KINGSBURY, Hammet Street, Taunton.

GENERAL REGULATIONS

FOR THE

EXHIBITION AT BARNSTAPLE,

COMMENCING ON MAY 30TH, 1859; SO FAR AS RELATES TO

AGRICULTURAL IMPLEMENTS,

ARTS, AND MANUFACTURES.

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1. No Implement, Machine, Work of Art, or other Article, will be admitted for Exhibition or appear in the Catalogue unless the notice of entry and specification thereof, duly filled up in duplicate, be delivered to the Secretary, and the fees thereon paid, on or before the 1st day of April, 1859.

N.B. Forms of notice and specification may be had of the Secretary, Mr. Henry St. John Maule, No. 2, Wood Street, Bath.

2. The notice must state the amount of the Shed-room required by the Exhibitor, and in calculating such amount Exhibitors will take notice that the Society's ordinary sheds are 20 feet wide and 7 feet high at the eaves.

3. Exhibitors will be required to pay to the Secretary on or before the 1st day of April, 1859, for the ordinary Shed-room required by them, at the rate of 2s. per foot run.

4. No Exhibitor will be allowed to exhibit any article outside his shed-room, except by special permission of the Stewards, in which case he will be required to pay 6d. per square yard for all ground so occupied.

5. Special Shedding open at both ends of sufficient height for Threshing-Machines, 20 feet in width, and in compartments of 14 feet each in length of frontage, will be provided for Exhibitors desiring special Shedding for Machinery in motion, or any other purpose, and giving notice thereof, and a charge will be made of 3l. 10s. for each of such compartments, the same to be paid on or before the 1st day of April, 1859. Exhibitors will be allowed to use sufficient space outside such compartments for driving their machinery free of charge.

6. Enclosed Shedding for the Exhibition of Works of Art and Industry will be provided for Exhibitors giving notice of their requirements, and paying for the same at the rate of 3s. 6d. per foot run, of a width of 20 feet, on or before the 1st day of April, 1859. Such enclosed sheds will have boarded sides and will be covered with canvas of *the best quality*.

7. Ground will be appropriated to Exhibitors desirous of erecting buildings for working Machinery, on their giving notice to the Secretary of their requirements, and paying for the ground occupied at the rate of 6d. per square yard, on or before the 1st day of April, 1859.

8. Exhibitors who shall enter Machines, Implements, Works of Art or Industry, and fail to exhibit the same, shall pay to the Secretary, Mr. Henry St. John Maule, a fine of  $2\frac{1}{2}$  per cent. on the value of the same, as stated in the specification, up to the value of 100*l.*, and 1 per cent. for any value exceeding 100*l.*, unless it shall be proved to the satisfaction of the Stewards that such failure was caused by inevitable accident.

9. The yard will be open for the reception of articles intended for exhibition from 7 A.M. to 6 P.M. on Thursday, Friday, and Saturday, the 26th, 27th, and 28th days of May, 1859, and not afterwards.

10. Every article when presented at the gate of the Show-yard must have on some conspicuous part of it a ticket bearing in legible characters the name of the Exhibitor and the number of his stand, which he will receive on application to the Secretary. Articles not so ticketed will be refused admission.

11. All articles must be arranged in the stands in the order in which they are placed in the specification, observing that the numbers must run in the same direction as those of the stands themselves.

12. No article will be allowed to be painted or varnished in the yard on pain of forfeiture; and any on which the paint is wet when presented at the gate will be refused admittance.

13. The Council of the Society will not be responsible for the safe keeping of any article exhibited, and will require Exhibitors to take charge of their own property, and will provide the servants of exhibitors with badges, which they will be required to wear, and which alone will entitle them to admission to the yard.

14. Exhibitors will provide all necessaries for exhibiting their machines in motion, and they will be permitted to bring into the yard hay, straw, corn, turnips, &c., for the purpose of exhibiting their implements in work under such regulations as shall be made by the Stewards.

N.B. Arrangements will be made for enabling Exhibitors to supply themselves with corn in the straw, coal, and other necessaries, at moderate prices, provided they give notice, on or before the 1st April, 1859, of the quantities required, and give their orders in writing during the Exhibition.

15. Land and crops will be provided for the exhibition of Field Implements in work free of charge, under such limitations and arrangements as shall be determined by the Stewards.

16. Teams of horses will be provided for the use of such Exhibitors as shall, on or before the 1st day of April, 1859, give notice to the Secretary of their intention to exhibit any Implements in work in the Field, and of the number of horses they will require, and of the number of hours and of the days on which they will require them. A charge will be made of 2s. 6d. per hour for each pair of horses including the driver. Exhibitors may provide their own horses and drivers.

17. The Society will provide for taking the Implements to and from the Trial-Field at the times and subject to such arrangements as shall be fixed by the Stewards. Exhibitors may send duplicate implements for field-work.

18. After admission to the yard no article will be removable till 4 o'clock P.M. on Friday, the 3rd day of June, 1859.

19. All Persons and Articles entering the Show-yard will be subject to the Orders, Rules, and Regulations of the Council, and of the officers appointed by them.

20. Exhibitors will be required to furnish to customers the articles exhibited by them, and also others of equal quality, material, and manufacture at the prices entered in their specifications, provided that they are ordered at the Exhibition.

21. No Exhibitor will be allowed to affix to any implement any card or notice of any prize having been won by such implement at any meeting of this or any other Society, or to exhibit the same except in his own private catalogue.

N.B. The Yard will be open to visitors from Monday morning the 30th May, to Friday evening the 3rd of June, both inclusive.

By Order of the Council,

H. ST. JOHN MAULE, *Secretary.*

Jan. 15, 1859.

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## PRIZES FOR ESSAYS.

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No Prizes for Essays have yet been offered by the Council.

Should the Council decide to vote money for this purpose, due notice will be given by advertisement; or information may be obtained from the Secretary,

H. ST. JOHN MAULE,  
2, Wood-Street, Bath.



# List of Members.

CORRECTED TO JANUARY, 1859.

*Names thus (\*) distinguished are Governors.*

*Names thus (†) distinguished are Life Members.*

*\*\* Members are particularly requested to make the Secretary acquainted with any errors in the names or residences.*

| Name.                                                                       | Residence.                                         | Sub-<br>scriptions. |
|-----------------------------------------------------------------------------|----------------------------------------------------|---------------------|
| HIS ROYAL HIGHNESS THE PRINCE CONSORT . . . .                               | Buckingham Palace, London . .                      | £. s. d.<br>5 0 0   |
| † WALES, HIS ROYAL HIGHNESS THE PRINCE OF, per J. R. Gardiner, Esq. . . . . | .. ..                                              | .. ..               |
| Abbott, C. H. . . . .                                                       | Long Ashton, Bristol . . . .                       | 1 1 0               |
| * Acland, Sir T. D., Bart. . .                                              | Killerton, Exeter . . . . .                        | 5 0 0               |
| * Acland, Sir P. Palmer, Bart.                                              | Fairfield, Bridgwater . . . .                      | 10 0 0              |
| * Acland, T. D. . . . .                                                     | Spydoncote, Exeter . . . . .                       | 5 0 0               |
| Adair, Desmond . . . . .                                                    | Heatherton Park, Taunton . .                       | 1 0 0               |
| † Adair, A. . . . .                                                         | Heatherton, Taunton . . . .                        | .. ..               |
| Adair, Capt. A. W. . . . .                                                  | Heatherton, Taunton . . . .                        | 1 1 0               |
| Adams, John . . . . .                                                       | Kittiscombe, Stokenham, Kings-<br>bridge . . . . . | 0 10 0              |
| Addams, C. . . . .                                                          | Holford, Bridgwater . . . . .                      | 0 10 0              |
| Addington, Hon. W. W. . .                                                   | Up-Ottery, Honiton . . . . .                       | 1 1 0               |
| Addington, H. John . . .                                                    | Langford Court, near Bristol .                     | 1 0 0               |
| Adney, Capt. Henry . . . .                                                  | Lympstone, Exeter . . . . .                        | 1 0 0               |
| Alford, Henry . . . . .                                                     | Taunton, Somerset . . . . .                        | 1 1 0               |
| Alford, W. . . . .                                                          | Plaistow, Barton Shirwell . .                      | 0 10 0              |
| Allcock, Thomas . . . . .                                                   | Ratcliffe-on-Trent . . . . .                       | 0 10 0              |
| Allen, Francis Thomas . .                                                   | West Kington, near Chippenham                      | 1 1 0               |
| Allen, James D. . . . .                                                     | Holt Pilton, Shepton Mallett .                     | 0 10 0              |
| Allen, J. R. . . . .                                                        | Lyngford House, Taunton . .                        | 1 0 0               |
| † Ames, John . . . . .                                                      | Clevelanda, Lyme . . . . .                         | .. ..               |
| * Amory, John Heathcoat .                                                   | Tiverton . . . . .                                 | 2 2 0               |
| Andrews, Genge Henry . .                                                    | Rimpton, Sherborne . . . .                         | 0 10 0              |
| Anstey, John . . . . .                                                      | Combe Lancey, Sandford, Cre-<br>dion . . . . .     | 0 10 0              |
| Anstey, Samuel . . . . .                                                    | Menabilly Farm, Fowey, Cornwall                    | 0 10 0              |
| Anthony, John . . . . .                                                     | Yealmpton . . . . .                                | 0 10 0              |
| Antrobus, Sir Edmund, Bart.                                                 | Hyde Park Corner, London . .                       | 1 1 0               |
| † Archer, Edward . . . . .                                                  | Southfield House, Great Malvern                    | 1 1 0               |
| Arnold, G. . . . .                                                          | Harepath, Beaford, Eggesford .                     | 0 10 0              |
| Arnold, Capt. W. . . . .                                                    | Nethercot, Winkleigh, Eggesford                    | 1 0 0               |

| Name.                                                     | Residence.                        | Sub-<br>scriptions. |
|-----------------------------------------------------------|-----------------------------------|---------------------|
|                                                           |                                   | £. s. d.            |
| * Ashburton, Lord . . . .                                 | The Grange, Arlesford, Hants . .  | 5 0 0               |
| Ashford, John . . . . .                                   | Loxbear, Tiverton . . . . .       | 0 10 0              |
| Ashford, W. . . . .                                       | Venmore, Woodbury, Exeter . .     | 0 10 0              |
| * Auckland, Baron, the Right<br>Hon. and Right Rev. . . . | Lord Bishop of Bath and Wells . . | 2 0 0               |
| Avery, William, and Co. . . .                             | Barnstaple . . . . .              | 0 10 0              |
| Avery, George . . . . .                                   | Upcot, Braunton, Barnstaple . .   | 0 10 0              |
| Aylesbury, J. H. Walker. . . .                            | Marpool, Exmouth . . . . .        | 1 1 0               |
| Babb, William . . . . .                                   | Ashbrittle, Wellington . . . .    | 0 10 0              |
| Babbage, Christopher . . . .                              | Bridgwater . . . . .              | 0 10 0              |
| Babbage, William Pitt. . . .                              | Milverton, Somerset . . . . .     | 0 10 0              |
| Badcock, H. . . . .                                       | Taunton . . . . .                 | 1 0 0               |
| Badcock, R. G. . . . .                                    | Taunton . . . . .                 | 1 0 0               |
| Badham, G. D. . . . .                                     | The Sparrowes Nest, Ipswich . .   | 1 0 0               |
| Bailey, C. D. . . . .                                     | Bath . . . . .                    | 1 1 0               |
| Bailey, Henry . . . . .                                   | Walgaston Farm, Berkeley . . .    | 0 10 0              |
| Bailey, James . . . . .                                   | Nynehead, Somerset . . . . .      | 0 10 0              |
| Bailey, James . . . . .                                   | Dowland Farm, Axmouth . . . .     | 0 10 0              |
| †Baillie, Evan . . . . .                                  | Ashley Court, Tiverton, Devon . . | . . .               |
| Baillie, Hamilton . . . . .                               | Ash Hall, Cowbridge, Glamorgan .  | 1 1 0               |
| Bailward, J. . . . .                                      | Horsington . . . . .              | 1 1 0               |
| Baker, H. J. . . . .                                      | Charlton, Horethorne . . . . .    | 0 10 0              |
| †Baker, Sir Edward B. . . . .                             | Ranston, Blandford . . . . .      | . . .               |
| Baker, Thomas . . . . .                                   | Cartuther, Liskeard . . . . .     | 0 10 0              |
| Baker, William . . . . .                                  | West Johnson, South Molton . . .  | 0 10 0              |
| Baldson, J. . . . .                                       | West Leigh, Bideford . . . . .    | 0 10 0              |
| Baldson, William . . . . .                                | Marwood, Devon . . . . .          | 0 10 0              |
| Bale, James . . . . .                                     | Westcott Farm, Barnstaple . . .   | 0 10 0              |
| Barrett, Edward . . . . .                                 | Taunton . . . . .                 | 0 10 0              |
| Barrett, Exall, and Co. . . . .                           | Reading . . . . .                 | 1 0 0               |
| Barrett, W. . . . .                                       | North Curry, Taunton . . . . .    | 1 1 0               |
| Barrette, Geo. A. . . . .                                 | Bath . . . . .                    | 0 10 0              |
| Bartlett, Wm. . . . .                                     | Ilsham, Torquay . . . . .         | 1 0 0               |
| Barton, C. . . . .                                        | Holebrook House, Wincanton . .    | 1 0 0               |
| *Bastard, Baldwin J. . . . .                              | Kitley, Yealmpton . . . . .       | 2 0 0               |
| Bastard, T. C. . . . .                                    | Charlton, Musgrove . . . . .      | 1 1 0               |
| Bastard, W. . . . .                                       | Slapton, Dartmouth . . . . .      | 0 10 0              |
| Bater, Robert . . . . .                                   | Drake's Farm, Upexe, Silvertown . | 0 10 0              |
| Batten, John, jun. . . . .                                | Aldon, Yeovil . . . . .           | 1 0 0               |
| †Baxendale, Joseph . . . . .                              | Woodside, Hertford . . . . .      | . . .               |
| Beachim, Zebedee . . . . .                                | Mells, Frome . . . . .            | 0 10 0              |
| Beadon, William . . . . .                                 | Otterhead, Honiton . . . . .      | 1 0 0               |
| Beague, C. P. . . . .                                     | Dulverton, Somerset . . . . .     | 1 0 0               |
| Bean, H. L. . . . .                                       | Ashcott, Glastonbury . . . . .    | 1 1 0               |
| Beare, Henry . . . . .                                    | Ilington, Newton Abbot . . . . .  | 0 10 0              |
| *Bedford, Duke of . . . . .                               | Endsleigh, Tavistock . . . . .    | 10 10 0             |
| Beevor, Rev. W. . . . .                                   | Cowbridge . . . . .               | 1 1 0               |
| Belfield, J. . . . .                                      | Parkfield, Torquay . . . . .      | 1 0 0               |
| Belfield, Rev. F. . . . .                                 | Primley Hill, Torquay . . . . .   | 1 0 0               |
| Benjafield, Edmund . . . . .                              | Silton Farm, Bourton, Dorset . .  | 0 10 0              |

| Name.                                        | Residence.                                                   | Sub-<br>scriptions. |
|----------------------------------------------|--------------------------------------------------------------|---------------------|
|                                              |                                                              | £. s. d.            |
| Benjafield, George . . . .                   | Maperton Farm, Wincanton . .                                 | 0 10 0              |
| Bennett, Rev. H. . . . .                     | Sparkford, Castle Cary . . . .                               | 1 0 0               |
| Bennett, Thomas . . . . .                    | Morchard Bishop, North Devon .                               | 0 10 0              |
| Benson, John . . . . .                       | Tavistock . . . . .                                          | 1 0 0               |
| Benson, Rev. J. P. . . . .                   | Witheridge . . . . .                                         | 1 1 0               |
| Bentall, Edward Hammond .                    | Heybridge, Maldon . . . . .                                  | 1 0 0               |
| Bernard, William H. . . . .                  | Cottington, Sidmouth . . . . .                               | 1 1 0               |
| Berry, R. L. . . . .                         | Chagford, Exeter . . . . .                                   | 0 10 0              |
| Besley, John . . . . .                       | Dypford, Bampton . . . . .                                   | 0 10 0              |
| Besly, W. H. . . . .                         | Dunmore House, Bradninch . .                                 | 1 0 0               |
| Beviss, John . . . . .                       | Sydling, Dorchester . . . . .                                | 1 0 0               |
| Bickford, — . . . . .                        | Palace, Crediton . . . . .                                   | 1 0 0               |
| Bicknell, W. . . . .                         | Milton, Martock . . . . .                                    | 0 10 0              |
| Bigg, Thomas . . . . .                       | Leicester House, Great Dover<br>Street, London, S.E. . . . . | 0 10 0              |
| Bird, Hugh . . . . .                         | Cardiff . . . . .                                            | 1 0 0               |
| Bird, Robert . . . . .                       | Newton St. Loe, Bath . . . . .                               | 1 0 0               |
| Birmingham, Robert . . . .                   | Holnicote, Minehead . . . . .                                | 0 10 0              |
| Birmingham, Wm. . . . .                      | Broadclyst, Exeter . . . . .                                 | 0 10 0              |
| Bishop, James . . . . .                      | East Looe, Cornwall . . . . .                                | 1 0 0               |
| Bishop, John Mullett . . . .                 | Cleeve, Bristol . . . . .                                    | 0 10 0              |
| Bishop, William Richard . .                  | Exeter . . . . .                                             | 1 0 0               |
| Blackburrow, John . . . . .                  | Towerhead, Banwell, Somerset .                               | 1 1 0               |
| Blake, Henry . . . . .                       | St. Erney, Landrake . . . . .                                | 0 10 0              |
| Blake, John . . . . .                        | Ackland Barton, Barnstaple . .                               | 0 10 0              |
| Blake, J. W. . . . .                         | Venne House, Wiveliscombe . .                                | 1 0 0               |
| Blake, William . . . . .                     | Bishop's Hull . . . . .                                      | 1 1 0               |
| Blandford, Henry . . . . .                   | Sandridge, Bromham, Chippenham                               | 0 10 6              |
| Blandford, H. . . . .                        | Baynton, Westbury . . . . .                                  | 0 10 0              |
| Blight, William . . . . .                    | Stoke Gabriel, Torquay . . . .                               | 0 10 0              |
| Blomart, John . . . . .                      | Willett House, Taunton . . . .                               | 1 0 0               |
| Bodley, Alfred . . . . .                     | Exeter . . . . .                                             | 1 0 0               |
| Bodley, John . . . . .                       | Stockleigh Pomeroy, Crediton .                               | 1 0 0               |
| Boger, Deeble . . . . .                      | Woolsdon Anthony, Devonport .                                | 1 0 0               |
| Boles, Rev. J. T. . . . .                    | Exmouth . . . . .                                            | 1 0 0               |
| Bond, A. . . . .                             | Orchard Portman, Taunton . . .                               | 0 10 0              |
| Bond, James . . . . .                        | Heathfield, Taunton . . . . .                                | 0 10 0              |
| Bond, Thomas . . . . .                       | North Petherton, Bridgwater . .                              | 0 10 0              |
| Boucher, Charles . . . . .                   | Wiveliscombe . . . . .                                       | 0 10 0              |
| Boucher, W. . . . .                          | Wiveliscombe . . . . .                                       | 0 10 0              |
| Boucher, William . . . . .                   | Denmark Hill, Camberwell . . .                               | 1 1 0               |
| Bourne, John W. . . . .                      | Ilchester . . . . .                                          | 0 10 0              |
| Bourne, Robert . . . . .                     | Totnes . . . . .                                             | 0 10 0              |
| Bousfield, Edward . . . . .                  | Sticklepath, Okehampton . . .                                | 0 10 0              |
| Boutcher, William . . . . .                  | Denmark Hill . . . . .                                       | 1 1 0               |
| *Bouverie, Hon. Pleydell P.,<br>M.P. . . . . | Brymore, Bridgwater . . . . .                                | 5 0 0               |
| Bouverie, P. P., jun. . . . .                | Brymore, Bridgwater . . . . .                                | 1 0 0               |
| Bowden, John . . . . .                       | Ipplepen, Newton Abbot . . . .                               | 1 0 0               |
| Bowhay, J. L. . . . .                        | Modbury . . . . .                                            | 0 10 0              |
| Bowly, Edward . . . . .                      | Siddington House, Cirencester .                              | 1 0 0               |

| Name.                        | Residence.                              | Subscriptions. |    |    |
|------------------------------|-----------------------------------------|----------------|----|----|
|                              |                                         | £.             | s. | d. |
| Brailey, Thomas . . . .      | Bishop's Tawton, Barnstaple . .         | 0              | 10 | 0  |
| Brailey, W. . . . .          | Hillside, Tawstock, Barnstaple .        | 0              | 10 | 0  |
| Bremridge, John . . . .      | High Bickington, Barnstaple . .         | 1              | 0  | 0  |
| Bremridge, Richard . . . .   | Barnstaple (Mayor of, 1858) . .         | 1              | 0  | 0  |
| Bremridge, Thos. J. . . .    | Exeter . . . . .                        | 1              | 1  | 0  |
| Brent, Robt., M.D. . . . .   | Sydney Cottage, Woodbury, Exeter        | 1              | 0  | 0  |
| Brereton, Rev. J. L. . . . . | West Buckland, South Molton . .         | 1              | 1  | 0  |
| Brinsmead, Thomas . . . .    | St. Giles, Great Torrington . . .       | 0              | 10 | 0  |
| Broadmead, Philip . . . .    | Olands, Milverton . . . . .             | 1              | 0  | 0  |
| Brook, Joseph . . . . .      | Brinsmore Tree, Yeovil . . . .          | 0              | 10 | 0  |
| Brook, John . . . . .        | Aldon Farm, Yeovil . . . . .            | 0              | 10 | 0  |
| Broom, John . . . . .        | Holcombe Barton, Ottery St. Mary .      | 0              | 10 | 0  |
| Broom, John . . . . .        | Culmstock, Wellington, Somerset         | 0              | 10 | 0  |
| Brown and Co. . . . .        | Bridgwater . . . . .                    | 0              | 10 | 0  |
| Brown and May . . . . .      | Wilts Foundry, Devizes . . . .          | 2              | 0  | 0  |
| Brown, Thomas . . . . .      | Plympton, Plymouth . . . . .            | 0              | 10 | 0  |
| Browne, Thomas Beale . . .   | Salperton Park, Andoversford . .        | 1              | 0  | 0  |
| Browne, Wm. . . . .          | Wrinscott, Newton St. Cyres . .         | 0              | 10 | 0  |
| Brunel, I. K. . . . .        | Westminster . . . . .                   | 1              | 1  | 0  |
| *Buck, Lieut.-Col. . . . .   | Hartland Abbey, Bideford . . . .        | 2              | 0  | 0  |
| Buckingham, J., jun. . . .   | Clothworthy Farm, South Molton .        | 0              | 10 | 0  |
| Buckingham, W. . . . .       | Exeter . . . . .                        | 1              | 0  | 0  |
| Bull, J. B. . . . .          | Church Farm, Atworth, Melksham          | 0              | 10 | 6  |
| Bull, Uriah . . . . .        | Mells, Frome . . . . .                  | 0              | 10 | 0  |
| *Buller, James W., M.P. . .  | Downes, Crediton . . . . .              | 3              | 8  | 0  |
| Buller, Wm. Wentworth . .    | Strete Raleigh House, Whimble, Exeter . | 1              | 0  | 0  |
| †Bullock, George . . . . .   | North Coker, Yeovil . . . . .           | . . .          |    |    |
| †Bullock, George Troyte . .  | North Coker . . . . .                   | . . .          |    |    |
| Bult, James S. . . . .       | Kingston, Taunton . . . . .             | 1              | 0  | 0  |
| Bulteel, John . . . . .      | Pamphlete, Ermebridge . . . .           | 1              | 0  | 0  |
| Bunt, Petherick . . . . .    | Exford, near Minehead . . . .           | 0              | 10 | 0  |
| Burden, George . . . . .     | Vierscott, Swimbridge . . . .           | 0              | 10 | 6  |
| Burnard, C. F. . . . .       | Lambhay, Plymouth . . . . .             | 1              | 0  | 0  |
| Burnett, Alexander . . . .   | Rosehill, Merton, Eggesford . .         | 1              | 0  | 0  |
| Burrington, T. . . . .       | Pinson Barton, Colebrook, Crediton .    | 0              | 10 | 0  |
| Burrow and Page . . . . .    | Morchard Bishop, North Devon . .        | 0              | 10 | 0  |
| Burston, James . . . . .     | Colton Farm, Nettlecombe, Taunton .     | 0              | 10 | 0  |
| Burton, Richard . . . . .    | Broadclyst, Exeter . . . . .            | 0              | 10 | 0  |
| Burton, Samuel . . . . .     | Broadclyst, Exeter . . . . .            | 0              | 10 | 0  |
| Busby, William . . . . .     | Newton-le-Willows, Bedale, Yorkshire .  | 1              | 0  | 0  |
| Bush, Clement . . . . .      | Weston, Bath . . . . .                  | 1              | 0  | 0  |
| †Bush, J. D. . . . .         | Bath . . . . .                          | . . .          |    |    |
| Bush, R. H. . . . .          | Litfield House, Clifton . . . .         | 1              | 0  | 0  |
| Butland, Robt. . . . .       | Paignton, Torquay . . . . .             | 0              | 10 | 0  |
| Butter, John, M.D. . . . .   | Windsor Villas, Plymouth . . .          | 1              | 0  | 0  |
| Butcher, William . . . . .   | Exeter . . . . .                        | 1              | 0  | 0  |

| Name.                             | Residence.                                   | Subscriptions. |
|-----------------------------------|----------------------------------------------|----------------|
|                                   |                                              | £. s. d.       |
| rell, H. B. . . . .               | Lackham House, Chippenham . . . . .          | 1 0 0          |
| ridge, W. C. . . . .              | Iron Works, Bristol . . . . .                | 0 10 0         |
| icott, John . . . . .             | Donyatt, Ilminster . . . . .                 | 1 0 0          |
| , Arthur . . . . .                | Bulland Lodge, Wiveliscombe . . . . .        | 1 1 0          |
| John . . . . .                    | Norton Ferris . . . . .                      | 0 10 6         |
| sw, John . . . . .                | Exeter . . . . .                             | 2 0 0          |
| v, John . . . . .                 | Crocombe Court, Taunton . . . . .            | 1 0 0          |
| sw, Sir W. P., Bart. . . . .      | Haccombe, Newton Abbot . . . . .             | . . .          |
| sw, Thos. . . . .                 | Collipreist, Tiverton . . . . .              | . . .          |
| sw, W. P. . . . .                 | Antony, Devonport . . . . .                  | 2 0 0          |
| arvon, Earl of. . . . .           | High Clere, Newbury . . . . .                | 2 0 0          |
| ell, John . . . . .               | Outer Yard, Silvertown . . . . .             | 0 10 0         |
| ngton, H. E. . . . .              | <i>Chronicle Office</i> , Bath . . . . .     | 0 10 6         |
| n, Hugh . . . . .                 | Warminster . . . . .                         | 0 10 0         |
| ithen, Rev. J. C. . . . .         | Challacombe, Barnstaple . . . . .            | 1 0 0          |
| , Stanley Edward . . . . .        | Follaton House, Totnes . . . . .             | 1 0 0          |
| , Wm. . . . .                     | Cold Ashton, Bath . . . . .                  | 0 10 0         |
| an, The Earl . . . . .            | Hill House, Bridgwater . . . . .             | 2 0 0          |
| raft, William . . . . .           | Bramshott House, Liphook, Hants . . . . .    | 0 10 0         |
| pernowne, Rev. Richard . . . . .  | Vineyard, Dartington, Totnes . . . . .       | 1 0 0          |
| non, T. . . . .                   | Wishford, Broadclyst . . . . .               | 0 10 0         |
| lder, Thomas . . . . .            | Aldbourne, Hungerford . . . . .              | 0 10 0         |
| ter, John . . . . .               | Arnold Terrace, Bow Road, London, E. . . . . | 1 0 0          |
| man, James . . . . .              | Widworthy, Honiton . . . . .                 | 1 0 0          |
| ple, William . . . . .            | Gornhay, Tiverton . . . . .                  | 0 10 0         |
| d and Munro . . . . .             | Bristol . . . . .                            | 1 0 0          |
| e, Edwd. . . . .                  | Woodhays, Tiverton . . . . .                 | 0 10 0         |
| e, Wm. . . . .                    | Zeals, Bampton . . . . .                     | 0 10 0         |
| b, James Richmond . . . . .       | Montacute, Yeovil . . . . .                  | 0 10 0         |
| chill, H. . . . .                 | Morchard Bishop, North Devon . . . . .       | 1 0 0          |
| , Charles . . . . .               | Printer, Bath . . . . .                      | 1 0 0          |
| ce, Cyrus . . . . .               | Street, near Glastonbury . . . . .           | 0 10 0         |
| ce, C. G. . . . .                 | Dumbleton, Evesham . . . . .                 | 0 10 0         |
| ce, Harry . . . . .               | Cloford, Frome . . . . .                     | 0 10 0         |
| ce, Jas. . . . .                  | Street, near Glastonbury . . . . .           | 0 10 0         |
| ce, John Aubrey . . . . .         | Street, near Glastonbury . . . . .           | 0 10 0         |
| ce, John . . . . .                | Luccombe, Minehead . . . . .                 | 0 10 0         |
| ce, R. H. . . . .                 | Bridwell House, Collumpton . . . . .         | 1 0 0          |
| rke, T. E. . . . .                | Tremlet House, Wellington . . . . .          | . . .          |
| ce, William . . . . .             | East Lynch Farm, Minehead . . . . .          | 0 10 0         |
| on, Shuttleworth, and Co. . . . . | Lincoln . . . . .                            | 2 2 0          |
| ents, W. . . . .                  | Gilscot Farm, Alwington . . . . .            | 0 10 0         |
| , Edmund H. . . . .               | Westholme, Shepton-Mallet . . . . .          | 1 0 0          |
| , Robt. . . . .                   | Westholme, Shepton-Mallet . . . . .          | 1 0 0          |
| ford, Lord . . . . .              | Ugbrook, Chudleigh . . . . .                 | . . .          |
| ton, The Lord . . . . .           | Heanton Satchville, Eggesford . . . . .      | 5 0 0          |
| es, W. . . . .                    | Garrett's, Banstead, Epsom . . . . .         | 1 1 0          |
| es, George . . . . .              | 57, Russell Square, London, W.C. . . . .     | 1 1 0          |
| er, George . . . . .              | Old Newnham, Plympton St. Mary . . . . .     | 0 10 0         |

9)

| Name.                             | Residence.                                                     | Sub-<br>scriptions. |
|-----------------------------------|----------------------------------------------------------------|---------------------|
|                                   |                                                                | £. s. d.            |
| Coaker, W. K. . . . .             | Court Barton, Charlton, Kings-<br>bridge . . . . .             | 0 10 0              |
| Coate, Henry . . . . .            | Sherborne, Dorset . . . . .                                    | 0 10 0              |
| Cock, John . . . . .              | Clysthydon, Collumpton . . . . .                               | 0 10 0              |
| Cock, John . . . . .              | Tutshill Farm, Abbotsham . . . . .                             | 0 10 0              |
| Cockey and Sons . . . . .         | Frome . . . . .                                                | 1 0 0               |
| Coleman, Richd. . . . .           | Chelmsford . . . . .                                           | 0 10 0              |
| Coleman, W. . . . .               | Chelmsford . . . . .                                           | 0 10 0              |
| Coleridge, F. J. . . . .          | Ottery St. Mary . . . . .                                      | 1 0 0               |
| Coleridge, Rev. E. E. . . . .     | Buckerell, Honiton . . . . .                                   | 1 0 0               |
| Coles, Wm. Carey . . . . .        | Yew-tree Farm, Yeovil . . . . .                                | 0 10 0              |
| Collier, James . . . . .          | Culmstock, Wellington, Somerset . . . . .                      | 0 10 0              |
| Collins, John . . . . .           | Wonham House, Bampton . . . . .                                | 1 1 0               |
| Collins-Splatt, H. . . . .        | Brixton House, Plympton . . . . .                              | 1 1 0               |
| Collins, Charles Palk . . . . .   | Dulverton, Somerset . . . . .                                  | 1 1 0               |
| Colthurst, C. T. . . . .          | Thurloxton, Bridgwater . . . . .                               | 0 10 0              |
| Colthurst, John . . . . .         | Chew Court, Chewmagna . . . . .                                | 1 0 0               |
| *Combe, R. T. . . . .             | Earnhill, Taunton . . . . .                                    | 2 0 0               |
| Comins, James . . . . .           | South Molton . . . . .                                         | 0 10 0              |
| Comins, Thomas Taylor . . . . .   | Chagford, Devon . . . . .                                      | 0 10 0              |
| Conolly, C. J. T. . . . .         | Cottles House, Bradford, Wilts . . . . .                       | 1 0 0               |
| Cook, Nathaniel . . . . .         | Aysford Court, Burlescombe,<br>Wellington, Somerset . . . . .  | 0 10 0              |
| Cook, N. . . . .                  | Goosemore, Halberton, Tiverton . . . . .                       | 0 10 0              |
| Cook, Robert . . . . .            | Tiverton, Devon . . . . .                                      | 0 10 0              |
| Cook, T. C. . . . .               | Tiverton, Devon . . . . .                                      | 0 10 0              |
| Coom, Henry . . . . .             | Duchy of Cornwall Office, Lost-<br>withiel, Cornwall . . . . . | 0 10 0              |
| Coombe, George . . . . .          | Creech St. Michael . . . . .                                   | 1 0 0               |
| Cooper, G. . . . .                | Exeter . . . . .                                               | 0 10 0              |
| Copleston, Rev. J. G. . . . .     | Offwell, Honiton . . . . .                                     | 1 0 0               |
| Copp, Charles . . . . .           | Cutton, Poltimore, Exeter . . . . .                            | 0 10 0              |
| Coram, Stephen . . . . .          | Trull, Taunton . . . . .                                       | 0 10 0              |
| Cording, John . . . . .           | Bathealton, Wellington . . . . .                               | 0 10 0              |
| Corfield, Charles Cox . . . . .   | Taunton . . . . .                                              | 0 10 0              |
| Corner, Edward . . . . .          | Woodland, Holford . . . . .                                    | 0 10 0              |
| Corner, Richard . . . . .         | Torweston, Williton . . . . .                                  | 1 0 0               |
| Corner, R. . . . .                | Chidgeley, Nettlecombe, Taun-<br>ton . . . . .                 | 0 10 0              |
| Corner, W. . . . .                | Woolcotts, King's Brompton . . . . .                           | 0 10 0              |
| Cornes, James . . . . .           | Barbridge, Cheshire . . . . .                                  | 1 0 0               |
| Cornish, Thos. R. . . . .         | Hayes Farm, Ideford, Chudleigh . . . . .                       | 0 10 0              |
| Coryton, Augustus . . . . .       | Pentillie Castle, Plymouth . . . . .                           | 1 0 0               |
| Cosens, W. . . . .                | Langdon, Dawlish . . . . .                                     | 1 0 0               |
| †Cotterell, Jacob Henry . . . . . | Bath . . . . .                                                 | . . .               |
| Cotterell and Spackman . . . . .  | Bath . . . . .                                                 | 1 0 0               |
| Cotton, Gilbert Knill . . . . .   | Chemist, Barnstaple . . . . .                                  | 0 10 0              |
| Cotton, J. K., and Son . . . . .  | Wine Merchants, Barnstaple . . . . .                           | 0 10 0              |
| Courtenay, Lord . . . . .         | Powderham Castle, Exeter . . . . .                             | 1 0 0               |
| Cox, E. G. . . . .                | Fore Street, Taunton . . . . .                                 | 0 10 0              |

| Name.                                       | Residence.                                      | Sub-<br>scriptions. |
|---------------------------------------------|-------------------------------------------------|---------------------|
|                                             |                                                 | £. s. d.            |
| Isaac . . . . .                             | Whatley, Frome . . . . .                        | 0 10 0              |
| Stephen . . . . .                           | Langton Court, Brislington . . . . .            | 1 0 0               |
| ns, Robert . . . . .                        | Pilton, Shepton-Mallet . . . . .                | 0 10 0              |
| ldock, F. . . . .                           | Lyppiat, Stratton, Bath . . . . .               | 1 0 0               |
| g, James . . . . .                          | Timsbury . . . . .                              | 1 0 0               |
| vahay, R. T. . . . .                        | Cyfartha Castle, Merthyr Tydvil . . . . .       | 1 1 0               |
| d, John . . . . .                           | Whiddon, Abbotskerswell . . . . .               | 1 0 0               |
| pin, Henry . . . . .                        | Chulmleigh . . . . .                            | 1 1 0               |
| ker, J. B. . . . .                          | Northover, Ilchester . . . . .                  | 0 10 0              |
| ker, Richard . . . . .                      | Whimpston, Modbury . . . . .                    | 0 10 0              |
| zman, W. . . . .                            | Paignton, Torquay . . . . .                     | 0 10 0              |
| wys, Rev. G. S. . . . .                     | Cruwys Morchard House, Tiverton . . . . .       | 1 1 0               |
| erwell, James . . . . .                     | Classey Farm, N. Petherton . . . . .            | 1 0 0               |
| erwell, J. Woodhouse . . . . .              | Overton Farm, West Monckton . . . . .           | 0 10 0              |
| ing, Elias . . . . .                        | Moreton Hampstead . . . . .                     | 0 10 0              |
| onshire, His Grace the<br>Duke of . . . . . | .. ..                                           | 5 0 0               |
| ger, Thomas . . . . .                       | Huntstile, near Bridgwater . . . . .            | 0 10 0              |
| oy, Edward . . . . .                        | Kerswell Farm, Hockworthy . . . . .             | 0 10 0              |
| rey, William Francis . . . . .              | Abbott's Bury, Newton Bushell . . . . .         | 1 0 0               |
| id, Evan . . . . .                          | Radyr Court, Cardiff . . . . .                  | 1 0 0               |
| ie, John . . . . .                          | Creedy Park, Crediton . . . . .                 | 1 0 0               |
| vie, Sir H. R. F., Bart.,<br>.P. . . . .    | Creedy Park, Crediton . . . . .                 | 3 3 0               |
| is, F. A. . . . .                           | Bridestowe, Okehampton . . . . .                | 0 10 0              |
| is, Geo. Venn . . . . .                     | Fitzhead, Milverton . . . . .                   | 0 10 0              |
| vis, Henry . . . . .                        | Oakhill, near Bath . . . . .                    | 2 2 0               |
| y, James . . . . .                          | North Molton . . . . .                          | 0 10 0              |
| y, J. Tanner . . . . .                      | Roseash, South Molton . . . . .                 | 1 0 0               |
| ys, Fras. . . . .                           | Gifford's Farm, Bampton . . . . .               | 0 10 0              |
| w, J. . . . .                               | Exeter . . . . .                                | 2 0 0               |
| e, Michael . . . . .                        | East Chinnock . . . . .                         | 0 10 0              |
| son, W. and F. . . . .                      | Market Place, Bath . . . . .                    | 0 10 0              |
| son, William . . . . .                      | Exeter . . . . .                                | 1 0 0               |
| , Samuel . . . . .                          | Culverhouse Farm, Dunsford,<br>Exeter . . . . . | 1 0 0               |
| ing, J. . . . .                             | Cotley Farm, Ottery St. Mary . . . . .          | 0 10 0              |
| ning, J. . . . .                            | Ottery St. Mary . . . . .                       | 0 10 0              |
| nis, J. . . . .                             | Sticklepath, Tawstock . . . . .                 | 0 10 0              |
| y, W. . . . .                               | 5, Lansdown Place, Plymouth . . . . .           | 1 0 0               |
| ron, Earl of . . . . .                      | Powderham Castle, Exeter . . . . .              | .. ..               |
| dney, George . . . . .                      | Hollond, Plympton St. Mary . . . . .            | 0 10 0              |
| er, J. and W. . . . .                       | Chagford, Exeter . . . . .                      | 0 10 0              |
| kinson, F. H. . . . .                       | Kingweston, Somerton . . . . .                  | 5 0 0               |
| by, G. D. W. . . . .                        | Sherborne Castle . . . . .                      | 2 0 0               |
| iam, John . . . . .                         | Exeter . . . . .                                | 1 0 0               |
| acombe, James . . . . .                     | Huntsham Barton, Tiverton . . . . .             | 0 10 0              |
| in, Henry . . . . .                         | Paignton, Torquay . . . . .                     | 0 10 0              |
| in, G. . . . .                              | Paignton, Torquay . . . . .                     | 0 10 0              |

| Name                             | Residence.                              | Sub-<br>scriptions. |
|----------------------------------|-----------------------------------------|---------------------|
|                                  |                                         | £. s. d.            |
| †Dizott, Edward, M.P.            | Bystock, Exeter                         | 1 0 0               |
| Dizott, John                     | Bovey Tracey, Newton Abbot              | 1 0 0               |
| Dixon, Hugh                      | Clanghton-cum-Grange, Birkenhead        | 1 0 0               |
| Dobbs, Francis                   | North Molton                            | 0 10 0              |
| Doble, Giles                     | Aylesbeare                              | 0 10 0              |
| Doble, Henry                     | Uffculme, Collumpton                    | 0 10 0              |
| Doble, Francis                   | Holcombe Rogus, Wellington              | 0 10 0              |
| Doble, John                      | Buckland St. Mary, Chard                | 0 10 0              |
| Doble, Richd.                    | Bartiliver, Probus, Cornwall            | 1 0 0               |
| Dowling, Edwyn                   | Vineyards, Bath                         | 1 0 0               |
| Downing, George                  | Pickwell, (Georgeham, Barnstaple        | 0 10 0              |
| Downing, Joshua                  | Horwood, Barnstaple                     | 0 10 0              |
| †Dunke, Sir T. T. F. Esq., Bart. | Nutwell Court, Lympstone, Exeter        | 0 10 0              |
| Drew, John                       | Penmore, Exeter                         | 0 10 0              |
| †Druce, E. Esq.                  | The Grange, Honiton                     | 0 10 0              |
| Duckworth, Sir J. T. B., Bart.   | Weir, Exeter                            | 2 0 0               |
| Dunn, Francis                    | Gugwell, Tiverton                       | 0 10 0              |
| Dunn, J. H.                      | Gillingham, Wincanton                   | 0 10 0              |
| Dunn, Robert                     | West of England Wheel-works, Wellington | 0 10 0              |
| Dunn, Rev. Robt.                 | Huntsham, Tiverton                      | 1 0 0               |
| Downing, Richard                 | Downend, Winkleigh, Eggesford           | 0 10 0              |
| Downing, William                 | Star Wars, Dorchester                   | 1 0 0               |
| Downing, Sir J. Esq.             | Star Wars, Exeter                       | 0 10 0              |
| Downing, S.                      | Star Wars, Exeter                       | 5 0 0               |
| Duck, Henry                      | Star Wars, Exeter                       | 0 10 0              |
| Dunn, William                    | Star Wars, Exeter                       | 0 10 0              |
| Dunn, Francis W.                 | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Robert                     | Star Wars, Exeter                       | 1 1 0               |
| Dunn, Thos. Whitway              | Star Wars, Exeter                       | 0 10 0              |
| Dunn, R. P.                      | Star Wars, Exeter                       | 0 10 0              |
| Dunn, E. W.                      | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Edward                     | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Robert                     | Star Wars, Exeter                       | 1 0 0               |
| Dunn, W.                         | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Thos. Viscount             | Star Wars, Exeter                       | 1 0 0               |
| Dunn, R. P.                      | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Robert                     | Star Wars, Exeter                       | 1 0 0               |
| Dunn, John                       | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Charles                    | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Joseph                     | Star Wars, Exeter                       | 1 0 0               |
| Dunn, John                       | Star Wars, Exeter                       | 1 0 0               |
| Dunn, John                       | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Rev. Henry                 | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Edward                     | Star Wars, Exeter                       | 1 0 0               |
| Dunn, Robert                     | Star Wars, Exeter                       | 1 0 0               |



| Name.                                 | Residence.                                   | Subscriptions. |
|---------------------------------------|----------------------------------------------|----------------|
|                                       |                                              | £. s. d.       |
| Elliott, John . . . . .               | Rockbeare, Exeter . . . . .                  | 1 0 0          |
| Elliott, William . . . . .            | Alphington, Exeter . . . . .                 | 0 10 0         |
| Elliott, Wm. Edwin . . . . .          | 5, Windsor Villas, Plymouth . . . . .        | 1 0 0          |
| Ellis, Edward . . . . .               | Alphington, Exeter . . . . .                 | 0 10 0         |
| Ellis, Edward . . . . .               | Norton, Newton St. Cyres . . . . .           | 0 10 0         |
| Ellis, Henry . . . . .                | Bampton, Devon . . . . .                     | 1 0 0          |
| *Elton, Sir A. H., Bart. . . . .      | Clevedon Court . . . . .                     | 3 3 0          |
| England, Henry White . . . . .        | Kingsbury Episcopi . . . . .                 | 0 10 0         |
| England, John . . . . .               | West Newton Farm, North Petherton . . . . .  | 0 10 0         |
| Falconer, R. W., M.D. . . . .         | Bath . . . . .                               | 1 0 0          |
| *Farquarson, John . . . . .           | Langton House, Blandford . . . . .           | 2 2 0          |
| Farrant, Mark . . . . .               | Growing, Collumpton . . . . .                | 1 0 0          |
| Farrant, William . . . . .            | Torquay . . . . .                            | 0 10 0         |
| Farrant, William . . . . .            | Duces Green, Wellington, Somerset . . . . .  | . . .          |
| Farthing, Walter . . . . .            | Nether Stowey, Bridgwater . . . . .          | 0 10 0         |
| Farthing, J. K. . . . .               | Nether Stowey, Bridgwater . . . . .          | 0 10 0         |
| Faulkner, Mrs. Keith . . . . .        | Torquay . . . . .                            | 1 1 0          |
| Feaver, John . . . . .                | West Camel, Ilchester . . . . .              | 0 10 0         |
| Feaver, William King . . . . .        | Charlton Adam, Somerton . . . . .            | 0 10 0         |
| Ferguson, Alex. . . . .               | Dartmoor, Tavistock . . . . .                | 0 10 0         |
| Ferrabee, James . . . . .             | Phoenix Iron Works, Stroud . . . . .         | 1 0 0          |
| Ferreira, G. A. . . . .               | Chudleigh, Devon . . . . .                   | 0 10 0         |
| Fisher, J. M. . . . .                 | Taunton . . . . .                            | 1 1 0          |
| Fishley, Francis . . . . .            | Fitzhead, Taunton . . . . .                  | 0 10 0         |
| *Fitzgerald, H. T. G. . . . .         | Maperton House, Wincanton . . . . .          | 2 0 0          |
| Flower, George Applin . . . . .       | Lewell Farm, Dorchester . . . . .            | 0 10 0         |
| Fookes, Henry . . . . .               | Whitchurch, Blandford . . . . .              | 0 10 0         |
| Fookes, Robert . . . . .              | Milton Abbas, Blandford . . . . .            | 1 0 0          |
| Ford, John . . . . .                  | Creedy Park, Crediton . . . . .              | 0 10 0         |
| Ford, Elias . . . . .                 | Newton Abbot . . . . .                       | 1 0 0          |
| Ford, John S. . . . .                 | Holbeton, Ermebridge . . . . .               | 0 10 0         |
| Ford, John, jun. . . . .              | Branscombe . . . . .                         | 0 10 0         |
| *Fortescue, The Earl . . . . .        | Castle Hill, South Molton . . . . .          | 5 0 0          |
| *Fortescue, the Hon. George . . . . . | Bocconoc, Cornwall . . . . .                 | 2 0 0          |
| Foster, George . . . . .              | Exmouth . . . . .                            | 0 10 0         |
| Foster, Richard . . . . .             | Castle, Lostwithiel, Cornwall . . . . .      | 1 1 0          |
| Fouracre, Thos. White . . . . .       | Durston, Taunton . . . . .                   | 0 10 0         |
| Fox . . . . .                         | Market Lavington . . . . .                   | 0 10 0         |
| Fox . . . . .                         | East Butterleigh, Collumpton . . . . .       | 0 10 0         |
| Fox . . . . .                         | Wellington . . . . .                         | 1 0 0          |
| Fox . . . . .                         | Shepton Mallett . . . . .                    | 0 10 0         |
| Fox . . . . .                         | Crediton . . . . .                           | 0 10 0         |
| Fox . . . . .                         | Pinnicombe, Kenn, Exeter . . . . .           | 0 10 0         |
| Fox . . . . .                         | Kingston, Taunton . . . . .                  | 1 1 0          |
| Fox . . . . .                         | Aber-camlas, Brecon . . . . .                | 1 1 0          |
| Fox . . . . .                         | Oakford House, Exeter . . . . .              | 1 0 0          |
| Fox . . . . .                         | Bickington, Newton Abbot . . . . .           | 0 10 0         |
| Fox . . . . .                         | Coombe Farm, Bradninch, Collumpton . . . . . | 0 10 0         |

| Name.                                                                     | Residence.                                                     | Sub-<br>scriptions. |
|---------------------------------------------------------------------------|----------------------------------------------------------------|---------------------|
|                                                                           |                                                                | £. s. d.            |
| Froude, William . . . . .                                                 | Dartington, Totnes . . . . .                                   | 1 0 0               |
| Fry, Messrs. A. and T. . . . .                                            | Bristol . . . . .                                              | 2 0 0               |
| Fry, John . . . . .                                                       | North-End Farm, Clutton . . . . .                              | 0 10 0              |
| Fry, John . . . . .                                                       | Woodgate, Wellington . . . . .                                 | 1 0 0               |
| Fulford, Baldwin . . . . .                                                | Great Fulford, Exeter . . . . .                                | 1 1 0               |
| Fursdon, Rev. E. . . . .                                                  | Dawlish . . . . .                                              | 1 0 0               |
| Fussell, John . . . . .                                                   | Mells, Frome . . . . .                                         | 0 10 0              |
| Fyfe, Wm. Wallace . . . . .                                               | County Gazette, Dorchester . . . . .                           | 1 0 0               |
| Game, John . . . . .                                                      | Milborne Wick, Sherborne . . . . .                             | 0 10 0              |
| Gapper, William . . . . .                                                 | Duddeston, Taunton . . . . .                                   | 0 10 0              |
| *Gard, Richard Somers . . . . .                                           | Rougemont, Exeter . . . . .                                    | 2 0 0               |
| †Gardiner, J. R. . . . .                                                  | Duchy of Cornwall Office . . . . .                             | . . .               |
| *Garratt, John, jun. . . . .                                              | Bishop's Court, Exeter . . . . .                               | 2 2 0               |
| Geare, John, jun. . . . .                                                 | Exeter . . . . .                                               | 1 1 0               |
| Gee, Thos. . . . .                                                        | The Castle, Upton-on-Severn . . . . .                          | 1 0 0               |
| Genge, Richard . . . . .                                                  | Limington, Yeovil . . . . .                                    | 0 10 0              |
| Gibbings, R. . . . .                                                      | Kennford, Exeter . . . . .                                     | 1 0 0               |
| Gibbs, Chas. . . . .                                                      | Bishop's Lydeard, Taunton . . . . .                            | 0 10 0              |
| Gibbs, Robert . . . . .                                                   | Carhampton, Dunster . . . . .                                  | 1 0 0               |
| Gibbs, Samuel . . . . .                                                   | Bath . . . . .                                                 | 0 10 0              |
| Gibbs, W. M. . . . .                                                      | Bishop's Lydeard, Taunton . . . . .                            | 0 10 0              |
| Gibbs, W. W. . . . .                                                      | Kittisford . . . . .                                           | 0 10 0              |
| Gibbs, Winter . . . . .                                                   | Taunton . . . . .                                              | 0 10 6              |
| Gilbert, J. P. . . . .                                                    | National Provincial Bank, Barn-<br>staple . . . . .            | 1 0 0               |
| Giles, Joseph . . . . .                                                   | Dunstone, Yealmpton . . . . .                                  | 0 10 0              |
| Gillard, John . . . . .                                                   | Fawn Hotel, Ermington . . . . .                                | 0 10 0              |
| Gillett, W. E. . . . .                                                    | Fairwater House, Taunton . . . . .                             | 1 1 0               |
| Gillham, George . . . . .                                                 | Southdown, Burlescombe . . . . .                               | 0 10 0              |
| Gliddon, John . . . . .                                                   | Williton . . . . .                                             | 0 10 0              |
| Gonzales, José del Riego<br>(Attaché to the Peruvian<br>Embassy). . . . . | Care of G. Smith, 22, Southampton<br>Street, London . . . . .  | 1 0 0               |
| Goodden, John . . . . .                                                   | Compton House, Sherborne . . . . .                             | 1 0 0               |
| Goode, George . . . . .                                                   | Carmarthen . . . . .                                           | 1 1 0               |
| Goodridge, J. Jackson . . . . .                                           | Paignton, Torquay . . . . .                                    | 0 10 0              |
| Goodwin, Josiah . . . . .                                                 | Gazette, Exeter . . . . .                                      | 1 1 0               |
| Gordon, Chas., jun. . . . .                                               | High House, Kenton, Exeter . . . . .                           | 1 1 0               |
| Gould, John . . . . .                                                     | Poltimore, Exeter . . . . .                                    | 1 1 0               |
| Gould, Joseph . . . . .                                                   | New Hall, Broadclyst . . . . .                                 | 0 10 0              |
| Gould, R. H. . . . .                                                      | 20, Cockspur Street, London, S.W. . . . .                      | 1 0 0               |
| Graburne, R. S. . . . .                                                   | Mells, Frome . . . . .                                         | 1 0 0               |
| Graddon, William . . . . .                                                | Brightley, Chittlehampton . . . . .                            | 0 10 0              |
| Grant, John . . . . .                                                     | Hutcherleigh, Halwell, Totnes . . . . .                        | 0 10 0              |
| Grant, Wm. Chas. . . . .                                                  | Hillersdon House, Collumpton . . . . .                         | 1 0 0               |
| *Gray, Benjamin . . . . .                                                 | Bath . . . . .                                                 | 2 2 0               |
| Gray, Benjamin, Dr. Ph., M.A. . . . .                                     | 22, Hamilton Terrace, St. John's<br>Wood, London, N.W. . . . . | 1 1 0               |
| Gray, John . . . . .                                                      | Kingweston, Somerton . . . . .                                 | 1 0 0               |

| Name.                          | Residence.                      | Subscriptions. |
|--------------------------------|---------------------------------|----------------|
|                                |                                 | £. s. d.       |
| Jonathan . . . . .             | Summer Hill House, Bath . . .   | 1 1 0          |
| ry, Arthur . . . . .           | Montacute, South Petherton . .  | 1 0 0          |
| ry, John . . . . .             | " " . . . . .                   | 1 0 0          |
| ry, R. . . . .                 | Barnstaple . . . . .            | 0 10 0         |
| ry, Arthur . . . . .           | Montacute, Yeovil . . . . .     | 1 0 0          |
| ion, William . . . . .         | Larkbere Farm, Tallaton, Ottery | 0 10 0         |
| ville, Ralph Neville . . . . . | Butleigh, Glastonbury . . . .   | 2 0 0          |
| le, William . . . . .          | Barnstaple . . . . .            | 0 10 0         |
| n, Benjamin S. . . . .         | Culm John, Broadclyst . . . .   | 0 10 0         |
| n, John . . . . .              | New House, Rewe . . . . .       | 0 10 0         |
| ing, Francis John . . . . .    | Walton Farm, Glastonbury . .    | 0 10 0         |
|                                |                                 |                |
| tt, John . . . . .             | Marpool Farm, Exmouth . . . .   | 0 10 0         |
| Francis . . . . .              | Blue Hayes, Broadclyst . . . .  | 1 1 0          |
| day, J. . . . .                | Chapel Cleve, Taunton . . . .   | 1 0 0          |
| , James . . . . .              | Colyford, Colyton . . . . .     | 0 10 0         |
| , John C. . . . .              | Molland, Southmolton . . . .    | 0 10 0         |
| , Joseph . . . . .             | Budlake, Broadclyst . . . . .   | 0 10 0         |
| ling, Henry . . . . .          | Dean Prior, Ashburton . . . .   | 0 10 0         |
| lyn, William . . . . .         | Buckfastleigh, Ashburton . . .  | 0 10 0         |
| ock, J. D. . . . .             | Halse, Milverton . . . . .      | 1 0 0          |
| y, Edward . . . . .            | Sierford, Cheltenham . . . . .  | 1 0 0          |
| am, Josiah . . . . .           | Yeovil . . . . .                | 1 0 0          |
| in, G. . . . .                 | Newton House, Yeovil . . . .    | 1 0 0          |
| ing, Rd. . . . .               | West Cranmore, Shepton Mallet   | 0 10 0         |
| ing, James . . . . .           | Waterson, Dorchester . . . . .  | 0 10 0         |
| ing, Joseph . . . . .          | Marksbury . . . . .             | 0 10 0         |
| ing, Rev. G. R. . . . .        | Gittisham Rectory, Honiton . .  | 1 1 0          |
| ing, T. Goldie . . . . .       | Halsannery, Bideford . . . . .  | 1 1 0          |
| ord, W. H., jun. . . . .       | Barley Wood, Wrington . . . .   | 1 1 0          |
| s, Chas. . . . .               | Ilchester . . . . .             | 0 10 0         |
| s, J. . . . .                  | Bittadon . . . . .              | 0 10 0         |
| tley, W. H. . . . .            | Lye Grove House, Sodbury . . .  | 2 2 0          |
| ey, Henry M. . . . .           | Leytonstone, Essex . . . . .    | 1 0 0          |
| er, Rev. John Manley . . . . . | Ideford Rectory, Chudleigh . .  | 1 0 0          |
| tes, Thomas . . . . .          | Tiverton . . . . .              | 0 10 0         |
| tins, Charles . . . . .        | Alton Pancras, Dorchester . . . | 0 10 0         |
| tins, Robert . . . . .         | Milborn Port, Somerset . . . .  | 0 10 0         |
| on, Robert C. . . . .          | Chittiscombe Barton, Tiverton . | 0 10 0         |
| on, Thomas C. . . . .          | Rixfarm, Tiverton . . . . .     | 0 10 0         |
| on, Thomas . . . . .           | Peter Street, Tiverton . . . .  | 0 10 0         |
| ard, Charles . . . . .         | Dartmouth Grange, Dartmouth .   | 0 10 0         |
| ard and Payne . . . . .        | Express Office, Bath . . . . .  | 1 0 0          |
| , Robert Thomas . . . . .      | Alphington . . . . .            | 1 1 0          |
| i, John . . . . .              | Sandford, Crediton . . . . .    | 0 10 0         |
| i, Robert . . . . .            | Shepton Mallet . . . . .        | 1 0 0          |
| i, Thomas . . . . .            | Sunderly, Bampton . . . . .     | 0 10 0         |
| i, William E. . . . .          | Gasworks, Honiton . . . . .     | 1 0 0          |
| thcoat, John, M.P. . . . .     | Tiverton . . . . .              | 2 2 0          |
| field, T. . . . .              | Stoodleigh, Tiverton . . . . .  | 1 0 0          |

| Name.                             | Residence.                                      | Sub-<br>scriptions. |
|-----------------------------------|-------------------------------------------------|---------------------|
|                                   |                                                 | £. s. d.            |
| Hebditch, Josiah . . . .          | Stratton, South Petherton . . . .               | 0 10 0              |
| Hellard, Robert . . . .           | Taunton . . . . .                               | 0 10 0              |
| Hemming, William . . . .          | Coldicott, Moreton in the Marsh . . . .         | 0 10 0              |
| Hewer, William . . . . .          | Sevenhampton, Highworth . . . .                 | 1 0 0               |
| Hewett, John . . . . .            | Edgborough Farm, Staplegrove, Taunton . . . . . | 0 10 0              |
| Hewett, William . . . . .         | Norton Court, Taunton . . . . .                 | 1 0 0               |
| Hewish, Andrew . . . . .          | Stoodleigh, Tiverton . . . . .                  | 0 10 0              |
| Hewit, James R. . . . .           | Land Farm, Silverton . . . . .                  | 0 10 0              |
| †Hewitson, W. . . . .             | Chaldon, Croydon . . . . .                      | 0 10 0              |
| Hewlett, W. S. . . . .            | Gosworthy, Newhouse, Ivybridge . . . .          | 0 10 0              |
| Heywood, Joseph . . . . .         | Lake Farm, Abbotsham . . . . .                  | 0 10 0              |
| Hibberd, Henry . . . . .          | Battle Farm, Reading . . . . .                  | 0 10 0              |
| Hickes and Isaac, Messrs. . . . . | Surveyors, Northgate Street, Bath . . . .       | 0 10 0              |
| Hippisley, E. . . . .             | Wells, Somerset . . . . .                       | 1 0 0               |
| †Hippisley, J. H. . . . .         | Stone Easton, Old Down . . . . .                | 1 0 0               |
| Hitchcock, Henry . . . . .        | Chilterne All Saints, Heytesbury . . . .        | 0 10 0              |
| Hitchcock, Thomas . . . .         | Brendon Hill Farm, Wiveliscombe . . . .         | 0 10 0              |
| Hitchman, W. . . . .              | Long Ashton, Bristol . . . . .                  | 0 10 0              |
| *Hoare, P. . . . .                | Luscombe, Dawlish . . . . .                     | 2 0 0               |
| Hobbs, William . . . . .          | Kencott, Lechlade . . . . .                     | 0 10 0              |
| Hobbs, William Fisher . . . .     | Boxted Lodge, Colchester . . . . .              | 1 0 0               |
| *Hobhouse, H. . . . .             | Hadspen House, Castle Cary . . . . .            | 2 0 0               |
| Hockin, Edward . . . . .          | Bude, Cornwall . . . . .                        | 1 0 0               |
| Hoddinott, Simon . . . . .        | Mitchel's Elm Farm, Wanstrove, Frome . . . . .  | 0 10 0              |
| *Hodge, Wm. Chapple . . . .       | Rawleigh Manor, Barnstaple . . . . .            | 2 0 0               |
| Hodges, Abraham . . . . .         | South Petherton . . . . .                       | 0 10 0              |
| Hodinott, John . . . . .          | East Cranmore, Shepton Mallet . . . . .         | 0 10 0              |
| Hodgson, Charles . . . . .        | Blagdon, Paignton, Torquay . . . . .            | 0 10 0              |
| Hodson, Rev. G. F. . . . .        | North Petherton . . . . .                       | 0 10 0              |
| Hogg, Rev. J. R. . . . .          | Torquay . . . . .                               | 1 0 0               |
| Hogg, William . . . . .           | Upton Pyne, Exeter . . . . .                    | 0 10 0              |
| Hole, Jas. . . . .                | Knowle, Dunster . . . . .                       | 1 1 0               |
| Hole, John . . . . .              | Corton Denham, Sherborne . . . . .              | 0 10 0              |
| Hole, Robert . . . . .            | Harwood House, Dunster . . . . .                | 1 0 0               |
| Hole, William . . . . .           | Hannaford, Barnstaple . . . . .                 | 0 10 0              |
| Hole, W. R. . . . .               | Park, Bovey Tracey . . . . .                    | 1 0 0               |
| *Holford, R. S. . . . .           | Weston Leigh, Tetbury . . . . .                 | 2 2 0               |
| *Holland, Edward . . . . .        | Dumbleton Hall, Evesham . . . . .               | 2 0 0               |
| Holman, Richard . . . . .         | Avalon House, Glastonbury . . . . .             | 0 10 6              |
| Holmes, Messrs. . . . .           | Norwich . . . . .                               | 2 2 0               |
| Hollway, Messrs. . . . .          | Bath . . . . .                                  | 0 10 0              |
| Hood, Hon. A. N. . . . .          | Cumberland Lodge, Windsor . . . . .             | 1 0 0               |
| *Hood, Sir A. Acland, Bart. . . . | St. Audries, Bridgwater . . . . .               | 10 0 0              |
| Hooper, John . . . . .            | Withecumbe, Chagford, Exeter . . . . .          | 1 0 0               |
| Hooper, William . . . . .         | Rushford Barton, Chagford . . . . .             | 0 10 0              |
| Hopkins, John . . . . .           | Swansea . . . . .                               | 0 10 0              |
| Horlock, Rev. Dr. . . . .         | Box House, Chippenham . . . . .                 | 1 1 0               |
| *Horner, Rev. J. . . . .          | Mells Park, Frome . . . . .                     | 5 0 0               |
| Hornsby and Son . . . . .         | Grantham, Lincoln . . . . .                     | 1 0 0               |

| Name.                        | Residence.                                                         | Subscriptions. |    |    |
|------------------------------|--------------------------------------------------------------------|----------------|----|----|
|                              |                                                                    | £.             | s. | d. |
| ord, John . . . . .          | Salston Barton, Ottery St. Mary                                    | 0              | 10 | 0  |
| ood, George C. . . . .       | Huish Barton, Bicknoller . . . .                                   | 0              | 10 | 0  |
| ins, Thos. . . . .           | Haselbury, Crewkerne . . . . .                                     | 1              | 0  | 0  |
| Edward . . . . .             | Bideford . . . . .                                                 | 0              | 10 | 0  |
| ard, James . . . . .         | Alphington . . . . .                                               | 1              | 0  | 0  |
| ard, Messrs. J. & T. . . . . | Bedford . . . . .                                                  | 1              | 0  | 0  |
| cvale, Thos. . . . .         | Choicehill, Chipping Norton . . . .                                | 1              | 0  | 0  |
| nes, James . . . . .         | Manna Mead Villas, Plymouth . . .                                  | 1              | 0  | 0  |
| ert, Thos. . . . .           | Pickwick, Chippenham . . . . .                                     | 0              | 10 | 0  |
| ne, Henry . . . . .          | Brunworthy, Churchstanton . . . .                                  | 1              | 0  | 0  |
| se, Sir Edward . . . . .     | Breamore, Salisbury . . . . .                                      |                |    |    |
| phries, E. and T. . . . .    | Pershore, Worcester . . . . .                                      | 1              | 0  | 0  |
| t, H. Carew . . . . .        | Maisonette, Stoke Gabriel, Totnes . .                              | 1              | 0  | 0  |
| t, Nicholas . . . . .        | Paignton, Torquay . . . . .                                        | 0              | 10 | 0  |
| ey, Thomas . . . . .         | Binder Farm, Wellington . . . . .                                  | 0              | 10 | 0  |
| ey, John Richards . . . . .  | Waybrooke, Exeter . . . . .                                        | 1              | 0  | 0  |
| ey, Thomas . . . . .         | Waybrooke, Exeter . . . . .                                        | 1              | 0  | 0  |
| hings, Samuel . . . . .      | Wenham House, Collumpton . . . .                                   | 1              | 1  | 0  |
| ham and Brown . . . . .      | Exeter . . . . .                                                   | 1              | 0  | 0  |
| ham, George . . . . .        | Netton Barton, Revelstoke, Ply-<br>mouth . . . . .                 | 0              | 10 | 0  |
| table, Rev. A. . . . .       | Sutton Blandford . . . . .                                         | 1              | 0  | 0  |
| yshe, Rev. John . . . . .    | Clysthydon, Collumpton . . . . .                                   | 5              | 0  | 0  |
| she, Rev. Roland . . . . .   | East Coker, Yeovil . . . . .                                       | 0              | 10 | 0  |
|                              |                                                                    |                |    |    |
| son, John, jun. . . . .      | Yalberton, Paignton, Torquay . . . .                               | 1              | 0  | 0  |
| as, J. H. . . . .            | Chichester Place, Exeter . . . . .                                 | 1              | 1  | 0  |
| as, Rev. C. T. . . . .       | Farmers' Club House, 39, New<br>Bridge Street, Blackfriars . . . . | 0              | 10 | 6  |
| as, Isaac . . . . .          | Cheltenham . . . . .                                               | 0              | 10 | 0  |
| es, Messrs. . . . .          | Mappowder, Blandford, Dorset . . . .                               | 0              | 10 | 0  |
| iss, George . . . . .        | Norton Ferris, Frome . . . . .                                     | 0              | 10 | 0  |
| in, S. W. . . . .            | Redruth, Cornwall . . . . .                                        | 0              | 10 | 0  |
| ner, Capt. Hugh . . . . .    | Wenvoe Castle, Glamorgan . . . . .                                 | 2              | 0  | 0  |
| er, Rev. Alfred H. . . . .   | Wenvoe Castle, Cardiff . . . . .                                   | 1              | 0  | 0  |
| er, Robert Francis . . . . . | Wenvoe Castle, Cardiff . . . . .                                   | 1              | 1  | 0  |
| urd, Henry . . . . .         | Pinney Hill, Lyme, Dorset . . . . .                                | 0              | 10 | 0  |
| urd, Joseph . . . . .        | Chideock, Bridport, Dorset . . . . .                               | 0              | 10 | 0  |
| ll, Thomas . . . . .         | Surveyor, Taunton . . . . .                                        | 0              | 10 | 6  |
| l, John . . . . .            | Allercott, Dunster . . . . .                                       | 0              | 10 | 0  |
| s, R. Denison . . . . .      | Middleton Court, Huish Camp-<br>flower, Wiveliscombe . . . . .     | 1              | 0  | 0  |
| s, R. L. . . . .             | Blagden Lodge, Taunton . . . . .                                   | 1              | 1  | 0  |
| s, Winslow . . . . .         | Exeter . . . . .                                                   | 1              | 1  | 0  |
|                              |                                                                    |                |    |    |
| ie, Messrs. . . . .          | <i>Bath Journal</i> . . . . .                                      | 0              | 10 | 6  |
| ewich, S. T. . . . .         | Peamore, Exeter . . . . .                                          |                |    |    |
| away, J. W. . . . .          | Ryde, Isle of Wight . . . . .                                      | 1              | 0  | 0  |
| ow, Wm. B. . . . .           | St. Austell . . . . .                                              | 0              | 10 | 0  |

| Name.                                 | Residence.                                   | Sub-        |
|---------------------------------------|----------------------------------------------|-------------|
|                                       |                                              | scriptions. |
|                                       |                                              | £. s. d.    |
| Kelly, John . . . . .                 | Filleigh House, Chudleigh . . . . .          | 1 0 0       |
| Kemp, John W. . . . .                 | Cudmoor Farm, Bampton . . . . .              | 0 10 0      |
| Kennaway, Mark . . . . .              | Exeter . . . . .                             | 1 1 0       |
| *Kennaway, Sir John, Bart. . . . .    | Escot, Ottery St. Mary. . . . .              | 2 2 0       |
| King, J. Webb . . . . .               | Ash Martock . . . . .                        | 1 0 0       |
| *King, R. King Meade . . . . .        | Walford House, Taunton . . . . .             | 2 0 0       |
| *King, Richard Meade . . . . .        | Pyrland Hall, Taunton . . . . .              | 2 0 0       |
| Kingdon, S. . . . .                   | Lynch, Thorverton . . . . .                  | 1 0 0       |
| Kingdon, Wm. . . . .                  | Treymills, Thorverton . . . . .              | 0 10 0      |
| Kinglake, A. . . . .                  | Weston-super-Mare . . . . .                  | 1 0 0       |
| Kingsbury, John . . . . .             | Taunton . . . . .                            | 0 10 0      |
| Knapp, J. T. . . . .                  | Clanfield, Bampton, Oxon . . . . .           | 0 10 0      |
| †Knight, F. W. . . . .                | Simonsbath, South Molton . . . . .           | . . .       |
| Knight, Thomas . . . . .              | Kingston, near Taunton . . . . .             | 0 10 0      |
| Knollys, J. E. . . . .                | Fitzhead Court, Taunton . . . . .            | 1 1 0       |
| Knowles, Frederick . . . . .          | Wrington . . . . .                           | 0 10 0      |
| Knowlman, John . . . . .              | Culmstock, Wellington, Somerset . . . . .    | 0 10 0      |
| *Knyfton, T. T. . . . .               | Uphill . . . . .                             | 2 0 0       |
|                                       |                                              |             |
| *Labouchere, The Right Hon. . . . .   | Stowey Court, Bridgwater. . . . .            | 5 0 0       |
| Lakeman, Edmd. Geo. . . . .           | Modbury . . . . .                            | 0 10 0      |
| Lakeman, Thos. . . . .                | Brixham . . . . .                            | 0 10 0      |
| Lamacraft, John . . . . .             | Broadclyst . . . . .                         | 0 10 0      |
| Lambert, R. S. . . . .                | 34, Princes Street, Bristol . . . . .        | 1 0 0       |
| Lambshhead, William . . . . .         | Rose Mount, Ipplepen, Newton Abbot . . . . . | 0 10 0      |
| Landrey, William . . . . .            | Holm Cott, Ashburton . . . . .               | 0 10 0      |
| Lane, James . . . . .                 | White Lion Hotel, Bath . . . . .             | 0 10 6      |
| Lane, Robert . . . . .                | Great Gutton, Crediton . . . . .             | 0 10 0      |
| Lane, Robert, jun. . . . .            | Great Gutton, Shobrooke, Crediton . . . . .  | 0 10 0      |
| Lang, John . . . . .                  | Keaton, Ivybridge . . . . .                  | 0 10 0      |
| Langdon, George . . . . .             | Ashford, Barnstaple . . . . .                | 1 1 0       |
| Langdon, J. C. . . . .                | Parrock's Lodge, Chard . . . . .             | 0 10 0      |
| Langdon, James . . . . .              | Newport, Barnstaple . . . . .                | 0 10 0      |
| Langdon, John . . . . .               | Rainsbury . . . . .                          | 1 1 0       |
| Langdon, William . . . . .            | Ashford, Barnstaple . . . . .                | 0 10 0      |
| *Langton, W. H. P. Gore, M.P. . . . . | Newton Park, Bath . . . . .                  | 2 2 0       |
| Larey, L. . . . .                     | Bath . . . . .                               | 0 10 0      |
| Latimer, Thomas . . . . .             | Western Times, Exeter . . . . .              | 1 0 0       |
| Leach, William . . . . .              | Kentisbeare, Collumpton . . . . .            | 0 10 0      |
| Lee, Lee J. . . . .                   | Dillington, Ilminster . . . . .              | 1 0 0       |
| Lee, Richard . . . . .                | Hill, Coplestone, North Devon . . . . .      | 0 10 0      |
| Lethbridge, A. G. . . . .             | Taunton . . . . .                            | 1 1 0       |
| Leversedge, John . . . . .            | Taunton . . . . .                            | 0 10 0      |
| Leversha, William . . . . .           | Court Place, Withycombe, Dunster . . . . .   | 0 10 0      |
| Leverson, W. . . . .                  | Woolley, Beaford, Eggesford . . . . .        | 0 10 0      |
| Ley, James Peard . . . . .            | Powys Cottage, Sidmouth . . . . .            | 2 0 0       |
| Ley, Wm. . . . .                      | Woodlands, Exeter . . . . .                  | 1 0 0       |
| Lidstone, Roger . . . . .             | George Street, Plymouth . . . . .            | 0 10 0      |
| Light, Richard . . . . .              | Hill, Coplestone, North Devon . . . . .      | 0 10 0      |

| Name.                           | Residence.                                 | Subscriptions. |
|---------------------------------|--------------------------------------------|----------------|
|                                 |                                            | £. s. d.       |
| t, George . . . . .             | Barton, Instow . . . . .                   | 0 10 0         |
| t, Thos. Langford . . . . .     | Baghay Farm, Milverton . . . . .           | 0 10 0         |
| t, Thomas . . . . .             | Instow, Barnstaple . . . . .               | 1 1 0          |
| in, John . . . . .              | Maindre House, Newport, Monmouth . . . . . | 1 0 0          |
| as, Ralph . . . . .             | Tetton House, Taunton . . . . .            | 1 0 0          |
| es, Sir M., M.P. . . . .        | Maristowe, Plymouth . . . . .              | 3 0 0          |
| h, John . . . . .               | Stanchester House, Langport . . . . .      | 1 0 0          |
| a, Philip . . . . .             | Stokenham, Kingsbridge . . . . .           | 0 10 0         |
| as, William . . . . .           | East Coker, Yeovil . . . . .               | 0 10 0         |
| a, Benjamin Samuel . . . . .    | Kilminster, Frome . . . . .                | 0 10 0         |
| a, Joseph . . . . .             | Brewham House, Bruton . . . . .            | 1 0 0          |
| ey, John . . . . .              | Parsonage, Wiveliscombe . . . . .          | 0 10 0         |
| rell, G. F. . . . .             | Woodland House, Bridgwater . . . . .       | 1 0 0          |
| rell, Lieut.-Col. F. C. . . . . | Kilve, Bridgwater . . . . .                | 1 0 0          |
| rell, A. F. . . . .             | Quantoxhead, Bridgwater . . . . .          | 1 1 0          |
| rell, H. A. F. . . . .          | Badgworth Court, Axbridge . . . . .        | 1 1 0          |
| rell, Rev. A. H. F. . . . .     | Minehead, Bridgwater . . . . .             | 1 0 0          |
| kenzie, D. . . . .              | Prince Town, Dartmoor . . . . .            | 0 10 0         |
| kenzie, J. H. . . . .           | Teignmouth . . . . .                       | 1 1 0          |
| ge, John . . . . .              | Gittisham, Honiton . . . . .               | 0 10 0         |
| gs, Oliver . . . . .            | Bourton Foundry, Wincanton . . . . .       | 1 0 0          |
| ley, Wm. . . . .                | Westwood, Broadclyst . . . . .             | 0 10 0         |
| ning, H. . . . .                | South Molton . . . . .                     | 0 10 0         |
| ning, John . . . . .            | Hon Easton, Old Down . . . . .             | 0 10 0         |
| jen, William . . . . .          | Pen Mill, Yeovil . . . . .                 | 0 10 0         |
| ker, Rev. G. T. . . . .         | Uffculme, Collumpton . . . . .             | 1 0 0          |
| ks, John . . . . .              | Droridge, Dartington, Totnes . . . . .     | 0 10 0         |
| sh, Rev. G. . . . .             | Sutton Benger, Chippenham . . . . .        | 1 0 0          |
| shall, John . . . . .           | Belmont, Taunton . . . . .                 | 1 1 0          |
| in, James . . . . .             | Tye Farm, Collumpton . . . . .             | 0 10 0         |
| in, Thomas . . . . .            | Coomberoy, Broadclyst . . . . .            | 0 10 0         |
| ychurch and Sons . . . . .      | Haverfordwest . . . . .                    | 1 1 0          |
| on, Charles G. . . . .          | Beenleigh, Totnes . . . . .                | 0 10 0         |
| en, J. P. . . . .               | Hemyork, Wellington, Somerset . . . . .    | 0 10 0         |
| hew, J. . . . .                 | Clysthydon, Collumpton . . . . .           | 1 0 0          |
| hew, Jonah . . . . .            | Rydon House, Tallaton, Ottery . . . . .    | 1 0 0          |
| hews, Charles . . . . .         | Bradninch, Collumpton . . . . .            | 0 10 0         |
| hews, William Edwin . . . . .   | Gnaton Hall, Yealmpton . . . . .           | 1 0 0          |
| hews and Duke . . . . .         | Dunball Works, Bridgwater . . . . .        | 1 0 0          |
| tock, Charles Herbert . . . . . | Cockington, Torquay . . . . .              | 1 0 0          |
| , Frederick . . . . .           | Courier Office, Taunton . . . . .          | 1 1 0          |
| , George . . . . .              | Sheepharn, Modbury, Ivybridge . . . . .    | 0 10 0         |
| , R. . . . .                    | Rewe, Exeter . . . . .                     | 1 0 0          |
| , Robert . . . . .              | Grenson, Tavistock . . . . .               | 1 0 0          |
| nard, R. . . . .                | Taunton . . . . .                          | 0 10 0         |
| ens, George . . . . .           | London Hotel, Taunton . . . . .            | 0 10 0         |
| uish, J. . . . .                | Chemist, Taunton . . . . .                 | 0 10 0         |
| iman, J. . . . .                | Ashford House, Bridgwater . . . . .        | 0 10 0         |

| Name                                | Residence.                                       | Subscriptions. |
|-------------------------------------|--------------------------------------------------|----------------|
|                                     |                                                  | £. s. d.       |
| Merry, Richard . . . . .            | Goulds, Broadclyst . . . . .                     | 0 10 0         |
| Merson, James . . . . .             | Brinsworthy, North Molton . . . . .              | 0 10 0         |
| Merson, Thomas . . . . .            | Tiverton . . . . .                               | 1 0 0          |
| Messiter, Thomas . . . . .          | Barwick House, Yeovil . . . . .                  | 1 1 0          |
| Meyler, C. G. . . . .               | <i>Bath Herald</i> , Bath . . . . .              | 0 10 0         |
| Michelmores, Thomas . . . . .       | Berry House, Totnes . . . . .                    | 1 1 0          |
| Michelmores, Thomas, jun. . . . .   | Berry, Totnes . . . . .                          | 1 1 0          |
| Middleton, J. F. . . . .            | Kingston, Taunton . . . . .                      | 0 10 0         |
| Miles, G. F. W. . . . .             | Ford Abbey, Chard . . . . .                      | 1 1 0          |
| †Miles, John William . . . . .      | Kingsweston, Bristol . . . . .                   | .. .           |
| Miles, Thomas Binns . . . . .       | Langford Court Farm, near Bristol . . . . .      | 1 0 0          |
| Miles, William . . . . .            | Dix's Field, Exeter . . . . .                    | 1 1 0          |
| *Miles, Wm., M.P. . . . .           | Leigh Court . . . . .                            | 5 0 0          |
| Milford, Frederick . . . . .        | Exeter . . . . .                                 | 1 1 0          |
| Milford, George . . . . .           | Thorverton, Cullompton . . . . .                 | 0 10 0         |
| Milford, John . . . . .             | Exeter . . . . .                                 | 1 1 0          |
| Milford, Thomas . . . . .           | Thorverton, Cullompton . . . . .                 | 0 10 0         |
| Milford, Thomas, jun. . . . .       | Thorverton, Cullompton . . . . .                 | 0 10 0         |
| Millard, William . . . . .          | Leighton, Frome . . . . .                        | 0 10 0         |
| Miller, Thomas . . . . .            | Castle Farm, Sherborne . . . . .                 | 0 10 0         |
| †Miller, Dr. . . . .                | Exeter . . . . .                                 | .. .           |
| Mills, James . . . . .              | Limington, Ilchester . . . . .                   | 0 10 0         |
| Milsom and Son . . . . .            | Argyle Street, Bath . . . . .                    | 1 0 0          |
| Milward, John . . . . .             | Newton Abbott, Devon . . . . .                   | 0 10 0         |
| Mitchell, Thomas . . . . .          | Pinhoe, Exeter . . . . .                         | 1 0 0          |
| Mitchell, William . . . . .         | Penquit Lodge, Ermebridge . . . . .              | 1 0 0          |
| Mock, Edward . . . . .              | Braunton, Barnstaple . . . . .                   | 0 10 0         |
| Mockeridge, John . . . . .          | Greenway, Taunton . . . . .                      | 0 10 0         |
| Mogg, Carey Bailey . . . . .        | Bridgwater . . . . .                             | 1 1 0          |
| Mogg, John Rees . . . . .           | High Littleton . . . . .                         | 1 1 0          |
| Mogg, Samuel . . . . .              | Hyde Farm, West Monckton . . . . .               | 0 10 0         |
| Monday, James . . . . .             | West Manley, Tiverton . . . . .                  | 0 10 0         |
| Monday, Wm. . . . .                 | Runnington Farm, Wellington . . . . .            | 0 10 0         |
| *Moody, C. A., M.P. . . . .         | Kingsdon, Taunton . . . . .                      | 5 0 0          |
| Moon, James . . . . .               | High Street, Barnstaple . . . . .                | 0 10 0         |
| Moore, H. T. . . . .                | Houndstone, Yeovil . . . . .                     | 1 0 0          |
| Moore, John . . . . .               | Littlecott, Pewsey . . . . .                     | 1 0 0          |
| Moore, William . . . . .            | Hanley Castle, Upton-on-Severn . . . . .         | 1 0 0          |
| *Morgan, Sir Charles, Bart. . . . . | Tredeggar Park, Newport . . . . .                | 2 2 0          |
| Morle, Thomas B. . . . .            | Cannington Park Farm, Bridgwater . . . . .       | 0 10 0         |
| †Morley, Earl of . . . . .          | Saltram, Plymouth . . . . .                      | .. .           |
| Morris, Wm. . . . .                 | The Prison, Prince's Town, Dartmoor . . . . .    | 1 0 0          |
| Morse, Dennis . . . . .             | Uplowman, Tiverton . . . . .                     | 0 10 0         |
| Morton, John C. . . . .             | Streatley, Reading . . . . .                     | 1 0 0          |
| Moyses, H. G. . . . .               | Bathealton Court, Wellington, Somerset . . . . . | 1 0 0          |
| Mudge, William . . . . .            | Ford Farm, Newton Abbott . . . . .               | 0 10 0         |
| Murch, Clement . . . . .            | Sutton Barton, Collumpton . . . . .              | 0 10 0         |
| Murch, E. . . . .                   | Bridgwater . . . . .                             | 0 10 6         |



| Name.                            | Residence.                                   | Subscriptions. |
|----------------------------------|----------------------------------------------|----------------|
|                                  |                                              | £. s. d.       |
| ch, J. . . . .                   | Cranwell, Bath . . . . .                     | 2 0 0          |
| rave, J. . . . .                 | Emmerfield, Washfield, Tiverton              | 0 10 6         |
| s, Jaques . . . . .              | Torquay . . . . .                            | 1 1 0          |
| 1, W. B. . . . .                 | Stone Easton . . . . .                       | 1 1 0          |
| er, J. H. . . . .                | Alvescote, Lechlade . . . . .                | 0 10 0         |
| William . . . . .                | Cardiff . . . . .                            | 1 1 0          |
| John . . . . .                   | Craddock, Collumpton . . . . .               | 1 1 0          |
| erry, Giles . . . . .            | The Priory, Collumpton . . . . .             | 0 10 0         |
| erry, Thomas . . . . .           | Axmouth . . . . .                            | 0 10 0         |
| ery, Samuel . . . . .            | Southleigh, Honiton . . . . .                | 0 10 0         |
| nan, Joseph . . . . .            | West Lydford, Somerton . . . . .             | 0 10 0         |
| nan, Rev. W. James . . . . .     | Hockworthy, Wellington . . . . .             | 1 0 0          |
| rman, Thomas . . . . .           | Mamhead, Exeter . . . . .                    | 5 0 0          |
| ort, Theodore . . . . .          | St. Germans, Devonport . . . . .             | 1 0 0          |
| on, F. W. . . . .                | Barton Grange, Taunton . . . . .             | 1 0 0          |
| ton, J. G. . . . .               | Millaton House, Okehampton . . . . .         | 0 10 0         |
| on, John . . . . .               | Fitzhead, Taunton . . . . .                  | 0 10 0         |
| oletts, J. T. . . . .            | South Petherton . . . . .                    | 1 0 0          |
| olson, John . . . . .            | Lydney, Gloucester . . . . .                 | 1 0 0          |
| ian, George . . . . .            | Bath . . . . .                               | 1 1 0          |
| ian, George . . . . .            | Heanton Court, Heanton, Punchardon . . . . . | 0 10 0         |
| ian, Thomas . . . . .            | Harwood, Freshlestock, Barnstaple            | 0 10 0         |
| ngton, Charles, and Co. . . . .  | Commercial Wharf, Plymouth . . . . .         | 0 10 0         |
| ngton, Henry . . . . .           | Bartholomew Terrace, Exeter . . . . .        | 0 10 0         |
| s, John . . . . .                | Huxham, Bradninch . . . . .                  | 0 10 0         |
| s, Wm. . . . .                   | Loxbeer Barton, Tiverton . . . . .           | 0 10 0         |
| icote, Edw. Chas. . . . .        | Barnstaple . . . . .                         | 1 0 0          |
| icote, George Barons . . . . .   | Somerset Court, South Brent . . . . .        | 1 0 0          |
| icote, Rev. H. Mowbray . . . . . | Monkokehampston, Eggesford . . . . .         | 0 10 0         |
| thcote, Sir S. H., Bart. . . . . | Pynes, Exeter . . . . .                      | 5 0 0          |
| ney, Wm. . . . .                 | Lake Farm, Lifton, Launceston . . . . .      | 0 10 0         |
| orthy, William . . . . .         | Ford, Manaton, Moretonhampstead              | 0 10 0         |
| ombe, John . . . . .             | Hopcott, Minehead . . . . .                  | 0 10 0         |
| ay, Wm. . . . .                  | Taunton . . . . .                            | 0 10 0         |
| ay, John . . . . .               | Old Cleeve, Dunster . . . . .                | 0 10 0         |
| ay, Thomas . . . . .             | Dunster . . . . .                            | 0 10 0         |
| ay, William . . . . .            | Oak Trow . . . . .                           | 0 10 0         |
| gherty, Richard . . . . .        | Landrake, St. Germain's . . . . .            | 0 10 0         |
| g, Edmund . . . . .              | Ratfin, Amesbury . . . . .                   | 0 10 0         |
| ive, Lewis J. . . . .            | Bridgetown, Totnes . . . . .                 | 1 0 0          |
| r, John . . . . .                | Manor House, Middlezey . . . . .             | 1 0 0          |
| , Thomas . . . . .               | Trescow, Bodmin . . . . .                    | 0 10 0         |
| ne, James . . . . .              | Doulton Farm, Shepton Mallet . . . . .       | 0 10 0         |
| ham, W. . . . .                  | Pipshayne Farm, Bampton . . . . .            | 0 10 0         |

| Name.                            | Residence.                                          | Subscriptions. |    |    |
|----------------------------------|-----------------------------------------------------|----------------|----|----|
|                                  |                                                     | £.             | s. | d. |
| Page, Capt. Robert. . . . .      | 56, Pulteney Street, Bath . . .                     | 1              | 0  | 0  |
| Pain, Thomas . . . . .           | Laverstock Hall, Salisbury . . .                    | 1              | 0  | 0  |
| †Palk, Sir L. V., Bart. . . . .  | Haldon House, Exeter . . . . .                      |                |    |    |
| Palmer, Henry . . . . .          | Fairfield, Collumpton . . . . .                     | 0              | 10 | 0  |
| Palmer, John . . . . .           | Court Barton, Newton St. Cyres .                    | 1              | 0  | 0  |
| Palmer, Robert . . . . .         | Ditto ditto . . . . .                               | 0              | 10 | 0  |
| Paramore, Matthew . . . . .      | Talbot's Town, Brittas, County<br>Dublin . . . . .  | 0              | 10 | 0  |
| Paramore, Robert . . . . .       | Hindon, Minehead . . . . .                          | 0              | 10 | 0  |
| Parker, Arthur S. . . . .        | Exeter . . . . .                                    | 0              | 10 | 0  |
| Parker, George . . . . .         | Mells, Frome . . . . .                              | 0              | 10 | 0  |
| Parker, Henry . . . . .          | Burnett, near Bath . . . . .                        | 0              | 10 | 0  |
| Parker, Samuel . . . . .         | Havyatt's Green, Langford . . .                     | 0              | 10 | 0  |
| Parnell, William . . . . .       | Bowden, Yealmpton . . . . .                         | 0              | 10 | 0  |
| Parsons, George . . . . .        | Martock, Somerset . . . . .                         | 0              | 10 | 0  |
| Parsons, Henry . . . . .         | Haselbury, Crewkerne . . . . .                      | 0              | 10 | 0  |
| Parsons, James . . . . .         | Langport . . . . .                                  | 1              | 0  | 0  |
| Parsons, Thomas . . . . .        | Bridgwater . . . . .                                | 1              | 1  | 0  |
| Parsons, W. L. . . . .           | Midsomer Norton . . . . .                           | 1              | 1  | 0  |
| Partridge, John . . . . .        | Bow, Crediton . . . . .                             | 1              | 0  | 0  |
| Partridge, S. . . . .            | Sandford, Crediton . . . . .                        | 0              | 10 | 0  |
| Partridge, William . . . . .     | West Anstey, Dulverton . . . .                      | 0              | 10 | 0  |
| Pasmore and Savery . . . . .     | Exeter . . . . .                                    | 1              | 0  | 0  |
| Passmore, John . . . . .         | Aller, Bishop's Nympton, South<br>Molton . . . . .  | 0              | 10 | 0  |
| Patch, Frederick Owen . . . . .  | Broomfield, Tiverton . . . . .                      | 1              | 1  | 0  |
| Patton, Thomas . . . . .         | Bishop's Hull, Taunton . . . .                      | 1              | 0  | 0  |
| Peek, Wm. . . . .                | Luccombe, Minehead . . . . .                        | 0              | 10 | 0  |
| Pearce, Alfred John . . . . .    | Chantrey, Aveton, Gifford, Ivy-<br>bridge . . . . . | 1              | 0  | 0  |
| Pearse, John . . . . .           | Littleham, Exmouth . . . . .                        | 0              | 10 | 0  |
| *Pearse, Robt. Chas. Thos. . . . | Southwamborough Lodge, Odi-<br>ham, Hants . . . . . | 2              | 0  | 0  |
| Pearse, Samuel . . . . .         | Exeter . . . . .                                    | 1              | 0  | 0  |
| Pearse, Thomas . . . . .         | Upwman Court, Tiverton . . . .                      | 0              | 10 | 0  |
| Pedlar, J. Quick, jun. . . . .   | Wellington, Somerset . . . . .                      | 0              | 10 | 0  |
| Pendack, Henry Chas. . . . .     | Beardley Farm, Kettisford . . .                     | 0              | 10 | 0  |
| Pennell, R. L., M.D. . . . .     | Venn Bridge House, Dunsford . .                     | 1              | 1  | 0  |
| Penny, William . . . . .         | Kingsbury Episcopi, Langport . .                    | 0              | 10 | 0  |
| Perian, John Trowey . . . . .    | Bampton . . . . .                                   | 0              | 10 | 0  |
| Perry, Robert . . . . .          | New Farm, Priston . . . . .                         | 0              | 10 | 0  |
| Perry, William . . . . .         | Cholstrey, Leominster . . . . .                     | 0              | 10 | 0  |
| Perryman, Thomas . . . . .       | Easter Ackland, Landkey, Barn-<br>staple . . . . .  | 0              | 10 | 0  |
| Peters, Wm. Parsons . . . . .    | Yeabridge, South Petherton . . .                    | 0              | 10 | 0  |
| Pethebridge, Richd. . . . .      | Pill, Barnstaple . . . . .                          | 0              | 10 | 0  |
| Pethebridge, William . . . . .   | Tutshill, Pilton, Barnstaple . .                    | 0              | 10 | 0  |
| Phillips, J. H. . . . .          | Anstey, Dorchester . . . . .                        | 0              | 10 | 0  |
| *Phillips, Rev. James T. . . . . | Picton Castle, Haverfordwest . .                    | 2              | 2  | 0  |
| *Pickwick, Major W. . . . .      | Bathford, Bath . . . . .                            | 2              | 2  | 0  |
| Pidsley, R. H. . . . .           | Moor Farm, Sowton, Exeter . . .                     | 1              | 0  | 0  |

| Name.                         | Residence.                                               | Subscriptions. |
|-------------------------------|----------------------------------------------------------|----------------|
|                               |                                                          | £. s. d.       |
| Lady . . . . .                | Chippenham Park, Soham . . .                             | 1 0 0          |
| ley, W., M.P. . . . .         | Somerton . . . . .                                       | 1 0 0          |
| , John . . . . .              | Strete Raleigh Farm, Whimble . .                         | 1 0 0          |
| ian, Samuel . . . . .         | Rumwell Lodge, Taunton . . .                             | 1 0 0          |
| in, J. S. . . . .             | Dunchideock, Exeter . . . . .                            | 1 1 0          |
| an, Rev. W. . . . .           | Aveton Gifford, Kingsbridge . .                          | 1 0 0          |
| Robert, jun. . . . .          | Collumpton . . . . .                                     | 0 10 0         |
| Edwin . . . . .               | Drewsteignton, Exeter . . . . .                          | 1 0 0          |
| Frederick . . . . .           | Matford Farm, Alphington . . .                           | 0 10 0         |
| James Pitt . . . . .          | Newton, Drewsteignton, Exeter .                          | 1 0 0          |
| Nicholas . . . . .            | South Allington, Kingsbridge . .                         | 0 10 0         |
| Richard . . . . .             | Kenn, Exeter . . . . .                                   | 0 10 0         |
| r, Jos. . . . .               | Ball's Farm, Silvertown, Collumpton                      | 0 10 0         |
| nett, Rev. C. . . . .         | Holton, Wincanton . . . . .                              | 1 0 0          |
| rd, George . . . . .          | High Street, Taunton . . . . .                           | 0 10 0         |
| rd, Richard . . . . .         | Blagdon Paignton, Torquay . . .                          | 0 10 0         |
| blank, John . . . . .         | Newton Abbott . . . . .                                  | 0 10 0         |
| ord, Rev. W. . . . .          | Drewsteignton . . . . .                                  | 1 1 0          |
| y, Alexander . . . . .        | Nurseries, Plymouth . . . . .                            | 1 0 0          |
| ng, T. . . . .                | Whatley, Frome . . . . .                                 | 0 10 0         |
| Joseph . . . . .              | Coate, Martock . . . . .                                 | 0 10 0         |
| , James, jun. . . . .         | Whitchurch, Somerset . . . . .                           | 0 10 0         |
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| Edward . . . . .              | Great Toller, Dorchester . . . .                         | 0 10 0         |
| Thomas . . . . .              | Horningsham, Warminster . . . .                          | 0 10 0         |
| 3, W. J. P. . . . .           | Symonds bury, Bridport . . . . .                         | 1 0 0          |
| er, W. . . . .                | Hembury Fort, Honiton . . . . .                          | 2 0 0          |
| man, Lord . . . . .           | Bryanston, Blandford . . . . .                           | 5 0 0          |
| man, Hon. W. B. . . . .       | Bryanston, Blandford . . . . .                           | 2 0 0          |
| r, Thomas . . . . .           | Yellowford, Thorverton, Col-<br>lumpton . . . . .        | 1 0 0          |
| lett, Lord William . . . . .  | Bathwick . . . . .                                       | 2 0 0          |
| , J. D. . . . .               | Sprattshayes, Exmouth . . . . .                          | 0 10 6         |
| , John . . . . .              | Tallaton Farm, Tallaton, Ottery .                        | 0 10 0         |
| , Richard . . . . .           | Broad Oak, Clysthydon, Col-<br>lumpton . . . . .         | 0 10 0         |
| on, William Scott . . . . .   | Leigh, Chulmleigh . . . . .                              | 1 0 0          |
| aux, Sir E. S., Bart. . . . . | Netherton Hall, Honiton . . . .                          | 1 1 0          |
| am, W. . . . .                | Montacute, Yeovil . . . . .                              | 0 10 0         |
| nore, Abraham . . . . .       | Syston, Leicester . . . . .                              | 0 10 0         |
| r, Edward . . . . .           | 48, York Terrace, Regent's Park,<br>London, N.W. . . . . | 2 0 0          |
| or, T. and H. . . . .         | Cathay, Bristol . . . . .                                | 1 1 0          |
| r, Edward . . . . .           | 40, New Bridge Street, London,<br>E.C. . . . .           | 1 1 0          |
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| , Capt. John . . . . .        | Ford House, Bideford . . . . .                           | 1 0 0          |
| , Rev. W. . . . .             | West Charlton, Somerton . . . .                          | 1 1 0          |

))

| Name.                         | [Residence.                                                  | Sub-<br>scriptions. |
|-------------------------------|--------------------------------------------------------------|---------------------|
|                               |                                                              | £. s. d.            |
| Quartly, James . . . .        | Molland, South Molton . . . .                                | 1 0 0               |
| Quicket, Edward . . . .       | Langport . . . . .                                           | 1 1 0               |
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| Radcliffe, Rev. W. . . .      | Warleigh, Plymouth . . . .                                   | 1 1 0               |
| Raddall, W. . . . .           | Plymouth . . . . .                                           | 0 10 0              |
| Radmore, George . . . .       | Court Hayes, Thorverton, Col-<br>lumpton . . . . .           | 1 0 0               |
| Radmore, G. . . . .           | Pitt Farm, Thorverton . . . .                                | 1 0 0               |
| Randolph, James . . . .       | Milverton . . . . .                                          | 1 0 0               |
| Ransomes and Sims . . . .     | Ipswich . . . . .                                            | 2 0 0               |
| Rawlence, James . . . .       | Bulbridge, Wilton, Salisbury . .                             | 0 10 0              |
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| Raynes, Michael . . . .       | Mells, Frome . . . . .                                       | 1 0 0               |
| Redwood, Geo. . . . .         | Bathealton, Wellington. . . .                                | 0 10 0              |
| †Reed, J. Haythorne . . . .   | Burnham . . . . .                                            | . . .               |
| Reeves, Robert and John . .   | Bratton, Westbury, Wilts . . .                               | 0 10 0              |
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| Rendell, Walter . . . . .     | Buckland Barton, Coombinteign-<br>head, Teignmouth . . . . . | 0 10 0              |
| Rendle, S. S. . . . .         | Churston, Churston Ferrers . . .                             | 0 10 0              |
| Rendle, W. E. (Seed Merchant) | Plymouth . . . . .                                           | 1 0 0               |
| Rewe, John . . . . .          | Newton St. Cyres . . . . .                                   | 0 10 0              |
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| *Riccard, J. E. J. . . . .    | South Molton . . . . .                                       | 2 2 0               |
| Richards, Francis Trood . . . | Netherex, Exeter . . . . .                                   | 0 10 0              |
| Richards, W. H. . . . .       | Stapleton, Martock . . . . .                                 | 1 1 0               |
| Richmond and Chandler . . .   | Salford, Manchester . . . . .                                | 0 10 0              |
| Ridgway, A. . . . .           | Blackauton, Totnes . . . . .                                 | 1 0 0               |
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| †Rivers, Lord . . . . .       | Rushmore Lodge, Ludwick, Salis-<br>bury . . . . .            | . . .               |
| *Robartes, Thos. J. Agar . .  | Lanhydro, Bodmin . . . . .                                   | 2 0 0               |
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| Roberts, William . . . .      | Exeter . . . . .                                             | 1 0 0               |
| Rock, Philip . . . . .        | Gratton, High Bray, Barnstaple .                             | 0 10 0              |
| Rodbard, John R. . . . .      | Aldwick Court, Langford . . . .                              | 1 1 0               |
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| Rowcliffe, C. . . . .         | Stogumber, Taunton . . . . .                                 | 1 0 0               |
| Row, W. N. . . . .            | Cove, Tiverton . . . . .                                     | 1 1 0               |
| Rowde, Francis . . . . .      | Ekey, Lostwithiel, Cornwall . .                              | 1 0 0               |
| Rowe, Wm. Wevill . . . .      | Longbrook, Milton Abbot, Tavi-<br>stock . . . . .            | 0 10 0              |
| Rowley, T. S. . . . .         | Rowthorne, Chesterfield . . . .                              | 0 10 0              |
| Rowsell, Charles . . . . .    | Langford Budville, Wellington .                              | 0 10 0              |

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|------------------------------------|------------------------------------------------|----------------|
|                                    |                                                | £. s. d.       |
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| ; Edmund . . . . .                 | Castle Hill, Cricklade . . . . .               | 0 10 0         |
| sell, Right Hon. Lord J. . . . .   | . . . . .                                      | . . . . .      |
| er, John . . . . .                 | Saltford, Bath. . . . .                        | 1 0 0          |
| r, Hon. Henry . . . . .            | Fendon Hall, Stafford . . . . .                | 1 0 0          |
| er, W. J. . . . .                  | Bentham, Purton, Swindon . . . . .             | 0 10 0         |
| at Germans, Earl of . . . . .      | Port Eliot, Devonport . . . . .                | 5 0 0          |
| bury, Edwd. . . . .                | Venman's Farm, Bampton . . . . .               | 0 10 0         |
| r, Charles . . . . .               | Newlands, Broadclyst . . . . .                 | 0 10 0         |
| r, John . . . . .                  | Broomhill, Broadclyst . . . . .                | 0 10 0         |
| r, John . . . . .                  | Peverston, Collumpton . . . . .                | 0 10 0         |
| r, Robert . . . . .                | Westcott, Collumpton . . . . .                 | 0 10 0         |
| r, William . . . . .               | Broadclyst . . . . .                           | 0 10 0         |
| son, John . . . . .                | Brympton, Yeovil . . . . .                     | 0 10 0         |
| ers, E. A. . . . .                 | Stoke Hill, Exeter . . . . .                   | 1 0 0          |
| ers, James . . . . .               | Comberoy, Broadclyst . . . . .                 | 0 10 0         |
| ers, Thos. Coulson . . . . .       | Exeter . . . . .                               | 1 1 0          |
| rey, W. . . . .                    | Budehaven, Stratton, Cornwall . . . . .        | 0 10 0         |
| ford, Edwd. Ashford . . . . .      | Nynehead Court, Wellington . . . . .           | 3 0 0          |
| ders, Edward . . . . .             | Town Mills, Bath . . . . .                     | 0 10 0         |
| ders, T. T. H. . . . .             | Chudleigh . . . . .                            | 0 10 0         |
| y, John Thomas . . . . .           | Modbury, Plymouth. . . . .                     | 1 0 0          |
| bell, G. T., Capt. R.N. . . . .    | Kingwell, Bath . . . . .                       | 2 0 0          |
| , Thomas . . . . .                 | 5, Charing Cross, London, S.W.. . . . .        | 1 0 0          |
| , Wm. Robson, Dr. Ph. . . . .      | St. Leonard's, Exeter . . . . .                | 1 1 0          |
| amore, James . . . . .             | Helwill, Kenton, Exeter . . . . .              | 0 10 0         |
| , H. N. . . . .                    | Castle Hill House, Nether Stowey . . . . .     | 1 1 0          |
| an, Henry . . . . .                | Gerston, Totnes . . . . .                      | 1 0 0          |
| on, S. T. . . . .                  | Bluehayes House, Broadclyst . . . . .          | 1 0 0          |
| nour, Rev. Sir J. H. C., . . . . . | Northchurch, Birkhampstead . . . . .           | . . . . .      |
| rt. . . . .                        | . . . . .                                      | . . . . .      |
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| and, Frederick . . . . .           | Wellington, Somerset . . . . .                 | 1 1 0          |
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| , J. H. . . . .                    | Whatley Combe, Frome . . . . .                 | 1 1 0          |
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| fin, Thomas . . . . .              | Yms-du, Lantrissant, Glamorgan . . . . .       | 0 10 0         |
| outh, Lord Viscount . . . . .      | Up-Ottery, Devon . . . . .                     | 2 2 0          |
| fant, John . . . . .               | Coombe, Copplestone, North Devon . . . . .     | . . . . .      |
| fant, John Woolcombe . . . . .     | Coombe, Copplestone . . . . .                  | . . . . .      |
| , Sir John . . . . .               | Munty Court, Taunton . . . . .                 | 1 1 0          |
| ombe, Thomas . . . . .             | Stowford, West Down . . . . .                  | 0 10 0         |
| , Albert . . . . .                 | Tamar Terrace, Stoke, Devonport . . . . .      | 1 1 0          |
| , Bartholomew . . . . .            | Timsbury . . . . .                             | 1 0 0          |
| , F. A. . . . .                    | Escott Cottage, Ottery St. Mary . . . . .      | 0 10 0         |

| Name.                            | Residence.                                                    | Sub-<br>scriptions. |
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|                                  |                                                               | £. s. d.            |
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| Smith, Robert . . . . .          | Emmett's Grange, South Molton .                               | 1 0 0               |
| Smith, W. . . . .                | Bibury, near Fairford . . . .                                 | 1 0 0               |
| Smith, William . . . . .         | Kettering, Northampton . . .                                  | 1 1 0               |
| Smyth, F. . . . .                | Westland Pound, Kentisbury . .                                | 0 10 0              |
| Snell, Benjamin . . . . .        | Wayton, Hatt, Plymouth . . .                                  | 0 10 0              |
| Snell, John . . . . .            | Sand Barton, Sidbury, Sidmouth .                              | 0 10 0              |
| Snow, — . . . . .                | George Hotel, Bristol . . . .                                 | 0 10 0              |
| Snow, John . . . . .             | Braunton, Barnstaple . . . .                                  | 1 1 0               |
| Snow, Thomas . . . . .           | Franklyn, Exeter . . . . .                                    | 1 1 0               |
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| Sotheby, Rev. T. H. . . . .      | Milverton . . . . .                                           | 1 0 0               |
| *Sotheron, T. H. S. B. E., M. P. | Estcourt, Tetbury . . . . .                                   | 2 0 0               |
| Southcombe, William . . . .      | Aylscot, Westdown, Barnstaple .                               | 0 10 0              |
| Sparks, W. . . . .               | Crewkerne . . . . .                                           | 1 0 0               |
| Sparrow, John Wakeham . . .      | Lipson Terrace, Plymouth . . .                                | 0 10 0              |
| Spencer, J. P. . . . .           | Oakhill, Bath . . . . .                                       | 1 0 0               |
| Spencer, Michael . . . . .       | West Abertraw, Cowbridge . . .                                | 0 10 0              |
| Spencer, Walter . . . . .        | Little Chalfield, Chippenham . .                              | 0 10 0              |
| Sponder, Edward . . . . .        | Manna Mead, Plymouth . . . .                                  | 0 10 0              |
| Spiller, Robert . . . . .        | Branscombe, Sidmouth . . . .                                  | 0 10 0              |
| Spiller, J. . . . .              | Honiton . . . . .                                             | 0 10 0              |
| Spooner, Gerard . . . . .        | Cotford, Wiveliscombe . . . .                                 | 1 0 0               |
| Spooner and Bayley . . . . .     | Southampton . . . . .                                         | 0 10 0              |
| Spurway, Rev. Edward . . . .     | Heathfield, Taunton . . . . .                                 | 1 0 0               |
| Spurway, Captain F. . . . .      | 2nd Somerset Militia, Spring<br>Grove Park, Milverton . . . . | 1 1 0               |
| Spurway, John . . . . .          | Spring Grove Park, Milverton . .                              | 1 1 0               |
| Spurway, John P. . . . .         | Spring Grove Park, Milverton . .                              | 1 1 0               |
| Stanbury, J. . . . .             | Woolacombe, Morthoe . . . .                                   | 0 10 0              |
| Stanfield, J. E. . . . .         | Crewkerne . . . . .                                           | 0 10 0              |
| Staples, Joseph . . . . .        | Stoke-under-Ham, Yeovil . . . .                               | 0 10 0              |
| Stark, John C. . . . .           | Torquay . . . . .                                             | 1 0 0               |
| *Starkey, J. B. . . . .          | Spye Park, Chippenham . . . .                                 | 2 0 0               |
| Stark, Benjamin . . . . .        | Burrow Hill, Kingsbury, South<br>Petherton . . . . .          | 0 10 0              |
| Steer, — . . . . .               | Culmstock, Wellington, Somerset                               | 0 10 0              |
| Stephens, J. . . . .             | Wilton, Taunton . . . . .                                     | 1 0 0               |
| †Stevens, Rev. Archdeacon . .    | Otterton, Sidmouth . . . . .                                  | . . .               |
| Stoate, James . . . . .          | Minehead . . . . .                                            | 1 0 0               |
| Stone, John S. . . . .           | Newport, Monmouth . . . . .                                   | 1 0 0               |
| Stone, Rev. D. S. . . . .        | Walkhampton, Tavistock . . . .                                | 1 0 0               |
| Stone, William . . . . .         | Clayford Farm, Dulverton . . .                                | 0 10 6              |
| Strangways, H. B. . . . .        | Shapwick, Glastonbury . . . .                                 | 1 0 0               |
| Stratton, Richard . . . . .      | Broad Hinton, Swindon . . . .                                 | 1 0 0               |
| Strong, Thomas . . . . .         | Dunchideock, Exeter . . . . .                                 | 0 10 0              |
| Stuckey, William . . . . .       | Thorney Mills, Langport . . . .                               | 1 0 0               |
| Studdy, Henry . . . . .          | Waddeton Court, Totnes . . . .                                | 1 0 0               |
| Sturge, William . . . . .        | Bristol . . . . .                                             | 1 1 0               |

| Name.                           | Residence.                                           | Sub-<br>scriptions. |
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| ismen . . . . .                 | Reading . . . . .                                    | 1 1 0               |
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| son, Joseph Dyer . . . . .      | Banwell, Somerset . . . . .                          | 1 1 0               |
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| , Wm. . . . .                   | Tiverton . . . . .                                   | 0 10 0              |
| , Thos. B. . . . .              | Prescott House, Tiverton . . . . .                   | 0 10 0              |
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| eman, Robert . . . . .          | North Perrott, Crewkerne . . . . .                   | 1 0 0               |
| er, Jas. J. T. . . . .          | Lindridge, Newton Abbott . . . . .                   | 1 0 0               |
| l, J. H. . . . .                | Exeter . . . . .                                     | 1 1 0               |
| is, James . . . . .             | Lidlington Park, Bedfordshire . . . . .              | 1 0 0               |
| is, J. S. . . . .               | Wellington House, Clevedon . . . . .                 | 1 1 0               |
| is and Haywood . . . . .        | Wellington . . . . .                                 | 0 10 0              |
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| son, William . . . . .          | Maristowe, Plymouth . . . . .                        | 1 0 0               |
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| ycroft, Rev. J. . . . .         | Thornycroft Hall, Congleton . . . . .                | 1 0 0               |
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| William M. P. . . . .           | 42, Lowndes Square, London, S.W. . . . .             | 2 2 0               |
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GEORGE DOWN, *Hon. Sec.*

# WEST BUCKLAND

## FARM AND COUNTY SCHOOL.

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THIS School has been in operation for four months, and 10 boarders—that being the number for which accommodation was provided—are in residence.

The course of instruction has been, as nearly as possible, in accordance with the programme laid down by the Oxford and Cambridge Universities for their new examinations; and the authorities of the School desire to make the education given *thorough* and *practical*. In order to test the progress of the pupils, an Examination is held every Saturday, on the whole work of the week; and there are also quarterly Examinations, in which persons unconnected with the School are invited to take part. A Public Examination will be held annually, at which prizes and other rewards will be given.

The subjects of examination at Easter were:—

|                      |    |                                                                                                     |
|----------------------|----|-----------------------------------------------------------------------------------------------------|
| SCRIPTURE            | .. | The Gospel of St. Matthew.                                                                          |
| HISTORY              | .. | { Sketch of General History.<br>English History, from the accession of James I. to the Restoration. |
| GEOGRAPHY            | .. | The Physical Geography of Europe, and more particularly that of Europe.                             |
| ALGEBRA              | .. | To Simple Equations (class I.)                                                                      |
| EUCLID               | .. | Book I. (class I.)                                                                                  |
| ARITHMETIC           | .. | To the end of Vulgar Fractions.                                                                     |
| ENGLISH              | .. | Writing from dictation, Composition of Letters, &c., Paraphrasing.                                  |
| READING AND WRITING. |    |                                                                                                     |
| FRENCH.              |    |                                                                                                     |

AGRICULTURE, LAND SURVEYING AND DRILLING ARE ALSO TAUGHT.

The course of instruction will be *sound* rather than *extensive*, but other subjects will be added as the progress of the pupils



may cause it to be deemed necessary. It is proposed after Midsummer to add Chemistry, Book-keeping, Vocal Music, Drawing, and lessons from the first volume of Blackstone's Commentaries on the Laws of England.

The Analysis of Sentences, the History of the English Language and Literature, the study of some standard Author, (*e. g.* Shakespeare, Milton), Trigonometry, Logarithms, Mechanics, &c., will follow in due course; but, in general, a boy will be well grounded in more ordinary subjects (*e. g.* Composition of Letters, Arithmetic, &c.,) before he is permitted to take up the more difficult ones.

The Domestic arrangements are under the care of Mr. and Mrs. TAMLYN.

A Farm is connected with the School, and the pupils will have the opportunity of becoming acquainted with good systems of agriculture.

Monthly Reports are sent to the parents of each boy, giving an account of his progress.

Boys will be prepared for the Oxford and Cambridge Associate of Arts Examination, for the Civil Service, and for Agricultural and Commercial pursuits.

The terms are £25 per annum, and there are no charges for extra subjects. The charge for Day Boys is 6 guineas per annum.

Accommodation will be provided for 10 more Boarders at Midsummer.

There is connected with the School a *Preparatory Division* for younger Boys, of from 8 to 13 years of age, in which they will receive a thoroughly good Elementary Education, preparatory to their entering the Upper School. This Division is in charge of Mr. WM. MOORE, and under the immediate superintendence of the Head Master. The Terms are,—Boarders 18 guineas per annum, Day Boys, 4 guineas per annum.

J. H. THOMPSON,

HEAD MASTER.

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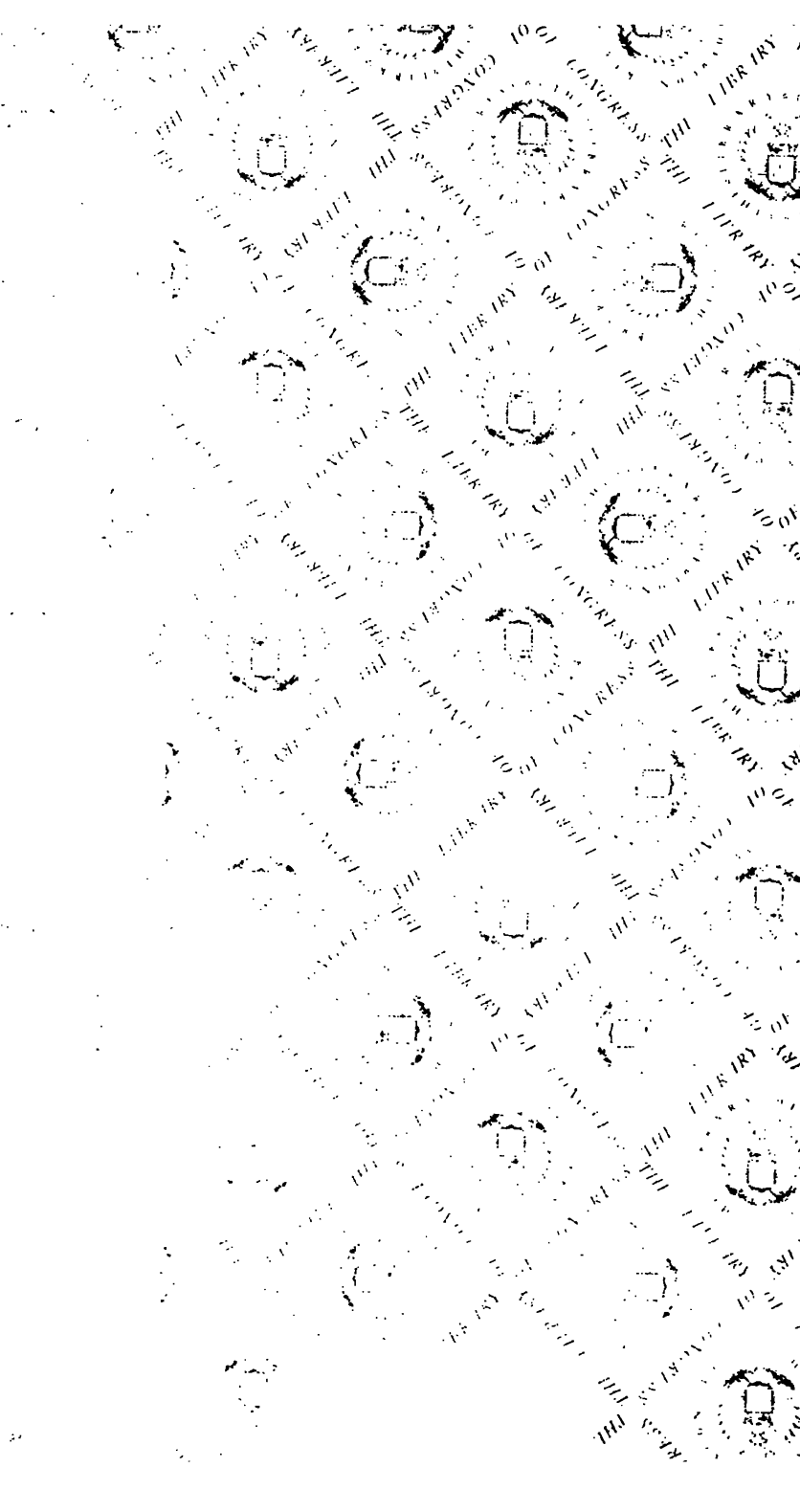
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